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TRENDS IN PHYSICIAN INCOME, 1978-1988

Final Report

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EXECUTIVE SUMMARY

1.0 BACKGROUND

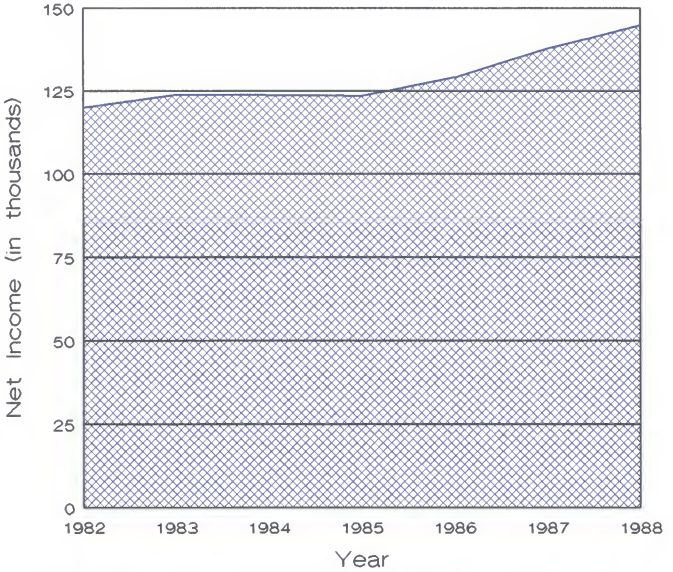
This report analyzes trends in the net income of nonfederal patient care physicians from 1978 to 1988. These trends are of interest for several reasons:

- In 1992, Medicare will begin the transition to reimbursing physicians based on a fee schedule. The Medicare Fee Schedule redistributes payments from invasive services to cognitive services. How have medical specialties that provide primarily cognitive services fared financially over the past decade compared to surgical specialties? Will fee reductions for invasive services be a financial hardship for procedure-oriented specialties?
- National expenditures on physician services have risen very rapidly in the 1980s, by 75 percent from 1980 to 1988 in constant dollars. How much have physicians profited from this enormous increase in spending? Have the larger expenditures simply compensated physicians for higher practice costs?
- The physician to population ratio rose by 23 percent from 1980 to 1988. Has the growth in the physician supply been so rapid that, in spite of the large expenditure increase, income per physician fell?
- The 1980s saw a massive shift from the inpatient to the outpatient setting, and also the development and/or diffusion of many surgical and diagnostic techniques, such as coronary artery bypass grafts, percutaneous transluminal coronary angioplasty, the extracapsular technique for cataract surgery, magnetic resonance imaging, computed tomography scanning, lithotripsy, and ultrasound. How have these developments impacted physician income, and which physicians have benefitted the most financially from them?
- The composition of the physician population has changed significantly in the last decade. Lower-earning women and minorities now comprise a larger proportion of the physician workforce, while higher-earning specialists continue to replace lower-earning general practitioners. The large "baby boom" generation of physicians has entered the traditionally most remunerative middle-aged years. How have these trends affected physician income?

2.0 TRENDS IN PHYSICIAN NET INCOME

Figure 1 shows the average net income of nonfederal patient care physicians, excluding residents, from 1982 to 1988. Income is from medical practice after expenses but before taxes and is in constant 1988 dollars.

Figure 1
Average Physician Net Income, 1982-88, in 1988 Dollars



Note: Nonfederal patient care physicians excluding residents.
Average annual net income after exepnses and before taxes.

Source: AMA, Socioeconomic Characteristics of Medical Practice, 1989.

Income is measured by the American Medical Association's Socioeconomic Monitoring System and values are subject to sampling error.

- Real physician income was flat from 1982 to 1985, but grew rapidly from 1985 to 1988.
- From 1982 to 1988, real physician income grew by 21 percent, from $119,800 to $144,700 (1988 dollars). Seventeen percent of this growth occurred between 1985 and 1988.
- Data from the HCFA Physician Surveys (not shown in the figure) indicates only 4 percent real growth in physician net income from 1978 to 1983, but 32 percent real growth from 1983 to 1988.

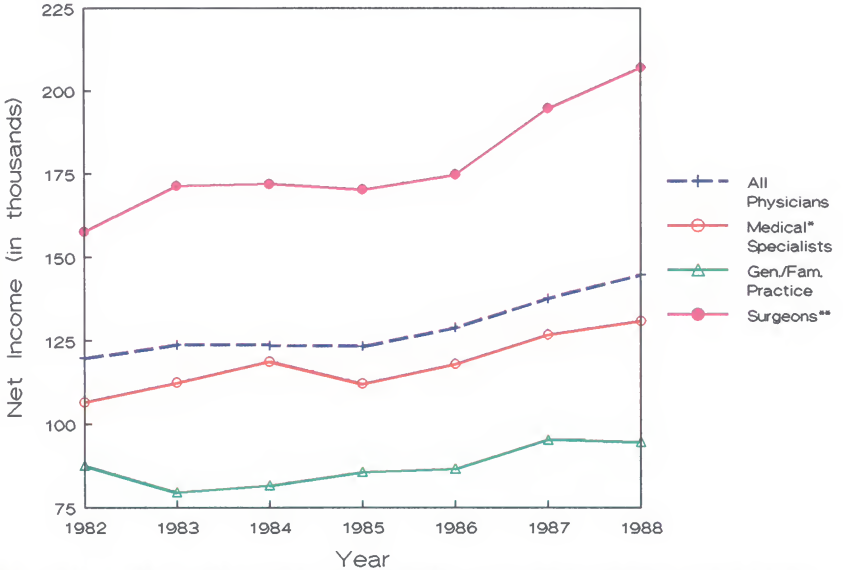
Figure 2 shows average real net income by major specialty from 1982 to 1988 as measured by the AMA surveys. Medical specialists excludes pediatricians and surgeons excludes obstetricians/gynecologists.

- Surgeons' incomes grew faster than general practitioners' or medical specialists' incomes; average income in the surgical specialties increased by 31 percent in real terms over the six year period. By 1988, surgeons averaged $207,000 in net income, more than double the $94,600 income of general practitioners, and 50 percent greater than the $130,900 income of medical specialists.
- The average real income of medical specialists rose by 23 percent from 1982 to 1988. General/family practitioners gained only 8 percent in real income.
- Data from the HCFA Physician Surveys (not shown in the figure) indicates slight declines in the real incomes of general/family practitioners and medical specialists between 1978 and 1983, before real growth of 14 and 30 percent, respectively, between 1983 and 1988. Surgeons gained 10 percent in real net income from 1978 to 1983, then an additional 39 percent from 1983 to 1988.

Figure 3 shows percentage changes 1983-1988 by detailed specialty in the real net income of physicians who were self-employed or employed by another physician. These percentage changes were tabulated from the HCFA Physician Practice Cost and Income Surveys of nonfederal patient care physicians, excluding residents. Income is from medical activities after expenses, but before taxes. The percentage changes are subject to substantial sampling variation, and should be regarded as approximate. Nevertheless, they provide an accurate picture of relative income changes by specialty.

Figure 2

Average Physician Net Income 1982–88, By Major Specialty, in 1988 Dollars

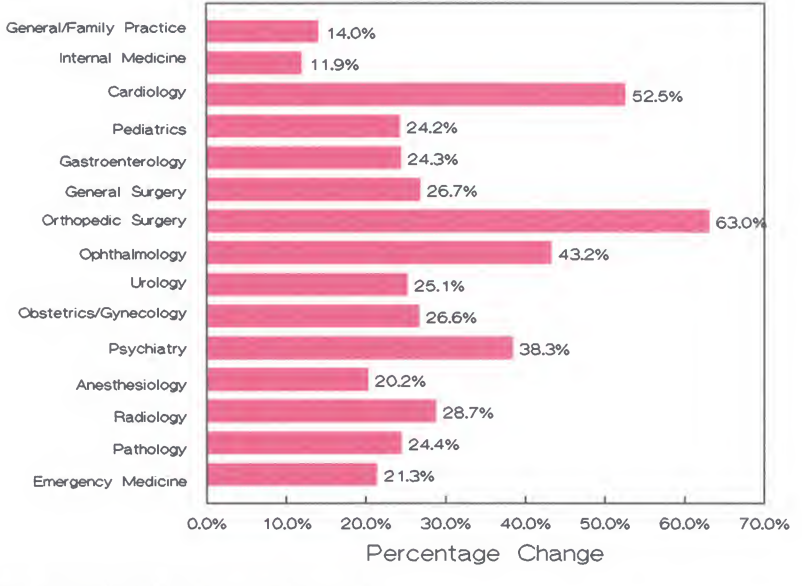


Note: Nonfederal patient care physicians excluding residents. Income after expenses but before taxes.
*Excluding pediatricians.
**Excluding obstetrics/gynecology.

Source: AMA, Socioeconomic Characteristics of Medical Practice. 1989.

Figure 3

Percentage Change 1983–88 in the Average Real Net Income of Self-Employed* Physicians, by Specialty



*Also includes physicians employed by another physician.
Note: Income from medical practice after expenses, but before taxes. Nonfederal patient care physicians.
Source: HCFA Practice Cost and Income Surveys.

- The real net income of all specialties rose from 1983 to 1988.

- The largest percentage increases in real income were enjoyed by orthopedic surgeons (63%), cardiologists (53%), and ophthmalogists (43%). According to the HCFA data, cardiovascular/thoracic surgeons experienced a very large 121 percent increase in real income, but a small sample of only 25 physicians in 1983 casts doubt on the accuracy of the percentage change. For this reason, cardiovascular/ thoracic surgeons are not included in Figure 3.

- The smallest percentage increases in income were experienced by the primary care specialties of general/family practitioners (14%) and internists (12%).

Figure 4 shows 1988 average net income by detailed specialty of physicians who are self-employed or employed by another physician. The data are from the 1988 HCFA Physician Practice Costs and Income Survey and are subject to the same qualifications mentioned in reference to Figure 3.

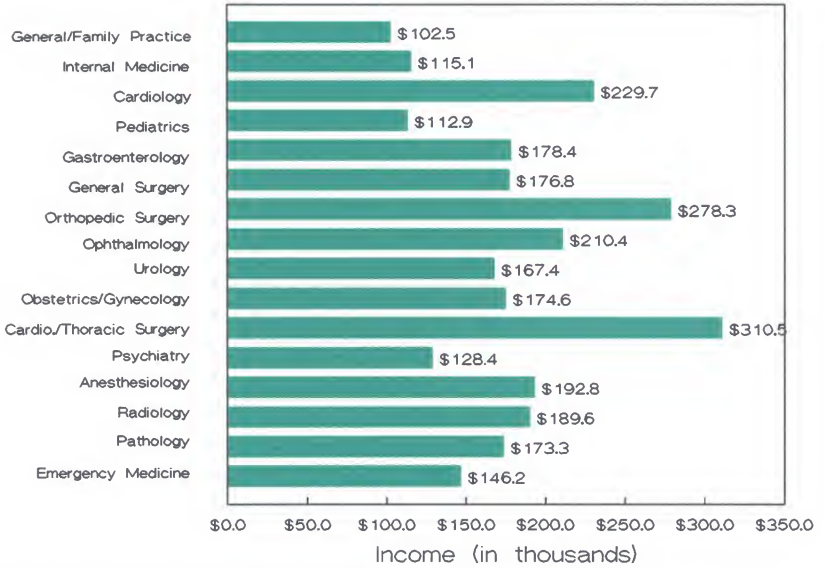
- The range in income by specialty is roughly 3 to 1. Self-employed cardiovascular/thoracic surgeons netted an average of $310,500 in 1988 compared to the average of $102,500 for self-employed general/family practitioners.

- Surgeons, cardiologists, gastroenterologists, radiologists, anesthesiologists, and pathologists earned the most and primary care physicians--general/family practitioners, internists, and pediatricians--the least.

Figure 5 compares percentage growth in physicians' real earnings to that of other occupations and educational groups from 1982 to 1989. The data are for male, year-round, full-time workers and are from the U.S. Bureau of the Census' Current Population Survey. The percentage changes are subject to sampling error and small differences (roughly less than 5 percentage points) are not necessarily meaningful. The Census Bureau does not break out physicians as a distinct occupational category, but they comprise approximately 70 percent of "health diagnosing occupations". Dentists, podiatrists, optometrists, and veterinarians are also included in this category.

Figure 4

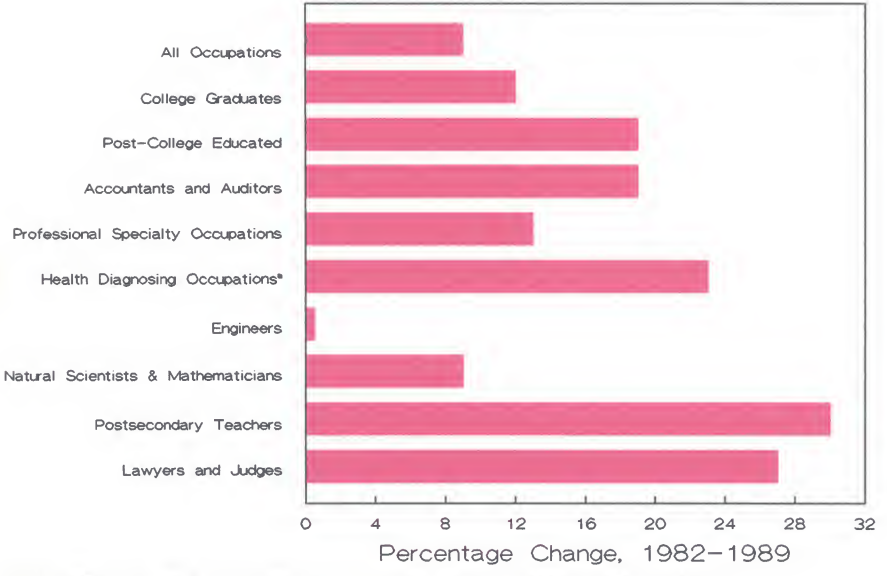
Average Net Income of Self-Employed* Physicians, by Specialty, 1988



*Also includes physicians employed by another physician.
Note: Income from medical practice after expenses, but before taxes. Nonfederal patient care physicians.
Source: HCFA Practice Cost and Income Survey, 1988.

Figure 5

Percentage Change in Real Average Annual Earnings, 1982–1989, By Education and Occupation



*Approximately 70 percent physicians. Also includes dentists, optometrists, and podiatrists.
Note: Male, year-round, full-time workers.

Source: U.S. Bureau of the Census, Current Population Reports.

- The 23 percent increase in the real average annual earnings of health diagnosing occupations (physicians) from 1982 to 1989 exceeded the earnings growth of all occupations (9%), college graduates (12%), and professional (specialty) occupations (13%).

- However, the rapid earnings growth experienced by physicians was not unique. The post-college educated, accountants and auditors, lawyers and judges, and postsecondary teachers achieved similar rates of earnings increase from 1982 to 1989. Nonetheless, physicians achieved a greater absolute growth in income than any of the occupational or educational groups included in Figure 5.

3.0 REASONS FOR PHYSICIAN INCOME GROWTH IN THE 1980s

Several factors appear to have contributed to the growth in physician income in the 1980s, while others have not been important.

- Changes in the age/sex/FMG status/specialty mix of the physician population explain only a small amount of income gains. Figure 6 shows 5 and 10 year income growth of self-employed physicians, unadjusted and adjusted for the changing mix of physicians. The rapidly growing proportion of female physicians, who traditionally have earned less, has tended to lower physician income, but changes in the age, FMG status, and specialty mix have tended to raise incomes. Overall, the changing mix explains less than 10 percent of growth in self-employed physician income.

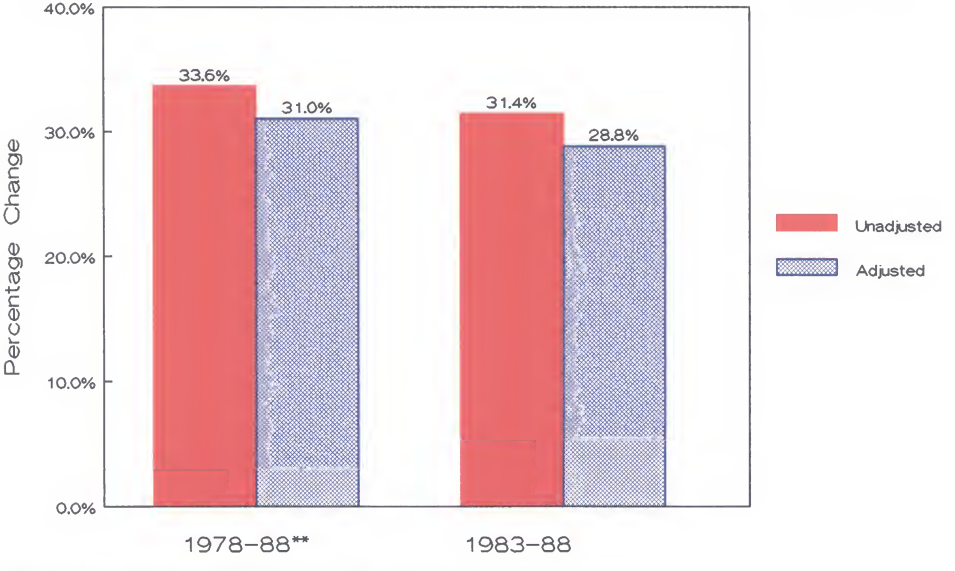
- Greater physician work effort also explains only a small amount of rising income. Average hourly income of self-employed physicians rose by 23 percent compared to 32 percent real growth in annual income from 1983 to 1988. Most of physician income gains are due to higher average hourly earnings, not to more hours worked.

- Physician income has not risen because of a larger number of patient visits. The total number of patient contacts per physician fell by 6 percent from 1982 to 1988. Rather, physicians are providing more services per patient visit.

- Slow growth in practice expenses does not account for gains in net income. Physician practice expenses have grown rapidly in the 1980s, by 80 percent for self-employed physicians from 1982 to 1988. Malpractice expenses have experienced especially large increases, growing by 174 percent. Nevertheless, physicians enjoyed large increases in net income, as gross revenues grew even faster than practice expenses. Obstetricians, who have faced particularly large increases in malpractice insurance premiums, have enjoyed above average net income growth according to AMA data.

Figure 6

Percentage Change 1978-88 in the Average Net Income of Self-Employed* Physicians, Unadjusted and Adjusted for Age, Sex, FMG, and Specialty Mix



*Also includes physicians employed by another physician.
**Physicians in groups of less than 10 in 16 specialties.

Note: Nonfederal patient care physicians excluding residents.
Source: HCFA Physician Practice Cost and Income Surveys.

- Both a greater quantity of physician services provided and higher profit per service have contributed to physician income growth. We estimate that each of these factors accounted for about half of the income growth of office-based physicians from 1982 to 1988. Higher profit margins per service appear to have resulted from larger increases in prices than in costs, from provision of a more profitable mix of services, and possibly from economies of scale (spreading fixed costs such as office and equipment rental over more services) and scope (jointly providing services such as office visits and diagnostic tests at lower cost).

- Technical change appears to be an important force behind increasing physician incomes in the 1980s. The development, perfection, and/or diffusion of many surgical and diagnostic techniques, such as coronary artery bypass grafts, percutaneous transluminal coronary angioplasty, the extracapsular technique for cataract surgery, magnetic resonance imaging, computed tomography scanning, lithotripsy, and ultrasound has augmented physician income.

- The shift in care from the inpatient to the outpatient setting appears to have benefitted physicians financially. They now earn an entrepreneurial return on capital (equipment, building space) and labor (aides) that was formerly appropriated by hospitals. The lower cost of ambulatory care for patients, both financially and in terms of convenience, appears to have greatly stimulated utilization. Surgeons have especially benefitted from the boom in outpatient surgery; many specialties have gained from greater use of outpatient diagnostic testing.

- Lower out-of-pocket costs (i.e., more comprehensive insurance coverage) have reduced patient resistance to greater utilization of physician services. In 1970, 42 percent of total national expenditures on physician services were paid for out-of-pocket. This proportion fell to 27 percent in 1980, and 19 percent in 1988.

- The physician supply and the physician to population ratio continued to grow rapidly in the 1980s. Nevertheless, the rate of increase in supply slowed in the 1980s. The average annual compound rate of increase in the ratio of patient care physicians to population fell from 3.2 percent between 1978 and 1983 to 2.4 percent between 1983 and 1988, a decline of one-quarter. For a given rate of increase in the demand for physician services, a slower rate of supply growth implies higher income per physician. The rate of increase in the number of surgeons per capita fell even more rapidly than the rate of increase in the overall physician supply which, combined with technical change and the move to outpatient surgery, explains their especially rapid income gains.

4.0 FURTHER RESEARCH

Physician net incomes appear to have risen rapidly in the 1980s primarily because physicians, particularly in certain specialties, are

providing higher volumes of lucrative procedures and tests. The utilization of many procedures and tests has mushroomed as they have been perfected and moved to the outpatient setting. Rapid technical change is constantly giving physicians the opportunity to provide highly profitable new services. Patients are paying less and less out-of-pocket, and so are demanding, or at least not resisting, increased utilization of services. And, at the same time demand has exploded, the rate of growth in the physician supply has slowed.

Income gains in the 1980s varied widely by specialty. Procedure-oriented physicians gained the most, and primary-care physicians the least.

- A fruitful area for future research would be to analyze physician income changes by specialty in more detail.

For example, how did orthopedic surgeons increase their income by 63 percent in the five years between 1983 and 1988? Was increasing volume of hip replacements, fracture repairs, arthoscopies primarily responsible? Increases in the prices of these procedures? How much did the work effort of orthopedic surgeons rise over this period? Did orthopedic surgeons increase their use of equipment and ancillary personnel? How has the mix of visits and work effort of orthopedic surgeons changed across inpatient and outpatient settings?

- Relating increases in physician income to the rising volume and prices of specific procedures and tests would be useful.

For example, the growth in coronary artery bypass graft (CABG) surgery alone is capable of explaining about half of the exceptionally large increases in the incomes of cardiovascular/thoracic surgeons from 1983 to 1988. The following is an illustrative, "back of the envelope" computation of how much the incomes of cardiovascular/thoracic surgeons may have been augmented by CABG surgery. Based on growth in the number of CABGs from 1982-87 (Boutwell et al., 1989) and the average Medicare allowed charge of $4,094 for CABG in 1987, we estimate that the incremental annual revenue from the increase in the number of CABGs performed from 1982 to 1987 was $680 million. Since Boutwell

et al., 1989, estimate that cardiovascular/thoracic surgeons perform about 83 percent of CABGs, these surgeons as a group gained about $565 million in gross revenue from CABG surgery. This increase in revenue was shared by only about 4,100 cardiovascular/thoracic surgeons, implying an increment in gross revenue per surgeon of about $140,000. After adjusting for cardiovascular/thoracic surgeons' share of overhead costs in gross revenue, the estimated increase in net income per surgeon is about $90,000. This $90,000 by itself explains about half of cardiovascular surgeons' growth in net income from 1983 to 1988 using the HCFA physician surveys.

- Also, it would be interesting to relate the changes in physician income by specialty to rates of growth in supply by specialty.

Have the incomes of obstetricians risen because of a reduced supply resulting from large increases in malpractice insurance costs or other factors? Has the number of deliveries per obstetrician risen in recent years? What impact has the rising cesarean section rate had on obstetrician incomes? How has the supply of cardiovascular/thoracic and orthopedic surgeons grown relative to the demand for their services?

Several other areas for further research are:

- Physician income changes could be compared to those of other professionals in more detail. For example, has any other profession enjoyed such rapid income growth while experiencing large increases in supply as physicians have?
- Have physician practice costs per service fallen as volume of services have risen? Have physicians benefitted from lower costs by providing services such as visits and tests jointly?
- Are some specialties enjoying especially rapid income growth through additional testing associated with a visit, e.g., X-rays by orthopedic surgeons?
- Have the growth in surgeons' practice costs kept pace with their billings, e.g., malpractice? Which costs are relatively fixed?
- Does the growth in multispecialty group practice result in more services, greater ancillary intensity, and lower average costs?
- Are incomes and growth rates similar nationwide? Are high incomes associated with more inappropriate care?

TRENDS IN PHYSICIAN INCOME, 1978-1988

1.0 INTRODUCTION

1.1 Background

In 1992 Medicare will begin the transition to a fee schedule for physician payment. In the first instance, the Medicare Fee Schedule will be budget neutral; its primary effect will be to redistribute payments from invasive services (surgery) to "evaluation and management" services (primarily visits). Thus, the Medicare Fee Schedule will tend to lower the incomes of surgeons and raise the incomes of primary care physicians. Similar changes in relative payments are likely to be adopted by many private insurers.

A resource-based relative value scale for physician payment encourages the provision of primary care services by raising the financial return to them relative to surgical and diagnostic services. It has also been promoted as a means of establishing equity among the various physician specialties by basing payments on resource costs. Physician net income is a prime indicator of the financial return to providing various types of services. On the eve of far-reaching redistributions of physician payments, it is useful to review trends in physician income. In what specialties have the financial returns increased most rapidly? Have the primary care specialties in fact been losing ground financially to the surgical specialties?

Trends in physician income are also relevant to other policy issues. National expenditures on physician services have increased very rapidly in the 1980s, from $41.9 billion in 1980 to $105.1 billion in 1988 (HCFA, Office of the Actuary). Even in constant 1988 dollars the growth was from $60.1 billion to $105.1 billion, or 75 percent. By comparison, inflation-adjusted expenditures on hospital services increased by "only" 44 percent from 1980 to 1988. Because of this rapid growth, cost control efforts, including reducing payments for "overpriced" services, have become more focussed on physician expenditures. In this context, it is relevant to know how much physicians

have profited from the large expenditure increases. One possibility is that greater expenditures have simply reflected higher practice costs faced by physicians. Skyrocketing premiums for malpractice insurance in the mid-1980s, especially for obstetricians, have received much publicity. Have higher practice costs eaten up the large revenue increases of physicians or has the net income derived from practice risen? Which physicians have gained the most financially? Would reductions in payments for certain services cause financial hardship for the physicians providing them?

The physician to population ratio has continued to increase rapidly in the 1980s, from 160 patient-care physicians per 100,000 population in 1980 to 196 per 100,000 population in 1988, a growth of 23 percent.* The growth in the physician supply led the influential GMENAC commission to predict a substantial physician "surplus" by the year 2000. According to standard economic theory, an increase in the supply of physicians should reduce their incomes unless the demand for their services is rising even more rapidly. Thus, the change in physician income has been used as an indicator of shortage or surplus (Schwartz and Mendelson, 1990). Has the growth in the physician supply been so rapid that, in spite of the large expenditure increases, income per physician has fallen? Has intensified competition among the larger number of physicians reduced their incomes?

In addition to its growing size, the composition of the physician population has changed in the last decade. Traditionally lower-earning women and minorities comprise a larger proportion of the physician workforce, while higher-earning specialists continue to replace lower-earning general practitioners. The large "baby boom" generation of physicians has entered the traditionally most productive and remunerative middle-aged years. These trends may be expected to affect physician income, and should be considered when examining the relationship of physician income to other trends.

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*Nonfederal patient-care physicians (including residents) per 100,000 civilian population (American Medical Association, Physician Characteristics and Distribution in the U.S. and Statistical Abstract of the U.S., both annual).

1.2 Organization of the Report

This report examines trends in physician income over the 10 years 1978 to 1988. The report is organized as follows. Chapter 2 discusses long and short run theories of physician income determination and empirical evidence on determinants of and trends in physician income. The discussion of the long run is contained in Section 2.1 and the short run in Section 2.2.

Chapter 3 describes data and methods. Our primary data sources are the 1978, 1983, and 1988 HCFA Physician Practice Cost and Income Surveys.* A general description of these surveys is provided (Section 3.1), the comparability of the income questions over time is analyzed (Section 3.2), item nonresponse to the income questions is studied (Section 3.3), and we describe how we adjusted income trends for the changing age, sex, FMG status, and specialty mix of the physician population (Section 3.4). We also use published data from the American Medical Association's Socioeconomic Monitoring System and the Census Bureau's Current Population Survey in the report. A description of these data is given in Section 3.5.

Chapter 4 presents physician income trends over the last 10 years. Section 4.1 analyzes published AMA data on trends in physician income and selected practice characteristics from 1982 to 1988. Section 4.2 presents 5 year (1983-1988) and 10 year (1978-1988) trends in physician income from the three HCFA physician surveys. Trends are examined for all surveyed physicians, by specialty, by demographic characteristic, and by geographic location. Changes in both annual income and hourly income are presented. Section 4.3 compares the growth in annual physician earnings from 1982 to 1989 to that of other educational and occupational groups using published Census Bureau data. The groups to which physicians are compared include the college

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*Throughout the report, we refer to the surveys by the year for which net income data were collected, not necessarily the year the survey was conducted.

and post-college educated, professional occupations, engineers, natural scientists, and lawyers.

After establishing descriptive trends in physician income in Chapter 4, the reasons for physician income growth in the 1980s are examined in Chapter 5. We consider changes in factors that affect both the supply of and demand for physician services. Specifically, we analyze changes in the rate of growth of the patient care physician supply (Section 5.1), in the quantity of services provided per physician and profit per service (Section 5.2), in the age/sex/FMG/specialty composition of the physician workforce (Section 5.3), in the extent of insurance coverage for physician services (Section 5.4), and in the diffusion of technology and shift to the outpatient setting (Section 5.5). Five year (1983-1988) and ten year (1978-1988) trends in physician income adjusted for age/sex/FMG/specialty mix and other factors are presented in Section 5.3.

2.0 DETERMINANTS OF PHYSICIAN INCOME: THEORY AND LITERATURE REVIEW

Economists and others have developed several theories of physician income determination. Our discussion of these theories is organized by whether they pertain to income determination in the long run, or in the short run. Long run theories emphasize long-term changes in the stock (number) of physicians that equalize returns available to individuals in a medical career versus alternative occupations. Short run theories take the stock (supply) of physicians as given and are more concerned with how changes in reimbursement and demand for physician services affect income over shorter time periods.

2.1 Long-Run Determinants of Physician Income

2.1.1 Theory

Long run theories of income determination are based on the simple premise that individuals choose a career that maximizes their expected satisfaction. The financial returns, or income, associated with an occupation is expected to be a major component of satisfaction, but it is not the only element. Job security and working conditions, for example, are other aspects of satisfaction with an occupation.

An occupation that offers attractive financial returns relative to alternatives tends to draw more entrants. Over time, according to standard economic laws of supply and demand, these entrants will depress the earnings of their occupation. A disproportionate number of individuals will continue to choose the occupation until the satisfaction available from entering that occupation equals the satisfaction available from alternatives. In a long-run equilibrium, the satisfaction associated with each occupation will be identical. Thus, in the long run, the income of an occupation is determined by those of alternative occupations. That is, the income of physicians in the long run will be determined in large part by the general return to educated labor in the economy.

Comparing the incomes of different occupations is complicated by their different required lengths of training. When physicians are receiving medical school and residency training, they incur direct educational expenses and also forgo income from working at an occupation requiring less training. That is, they could enter the labor force immediately after graduating from college rather than going on to medical school. These direct and opportunity costs of additional training must be taken into account when comparing the incomes of alternative occupations.

Noether (1986) derives a standard formula for the long-run equilibrium physician income. It is:

$$Y(m) = e^{rs}Y(c) + (e^{rs} - 1)[NT - Y(s)], \qquad (2\text{-}1)$$

where:

- $Y(m)$ = yearly physician income;
- e = the base of natural logarithms (approximately 2.72);
- r = the interest, or discount, rate;
- s = years of schooling (medical school and residency);
- $Y(c)$ = yearly earnings in an alternative occupation, often taken to be the average annual earnings of college graduates;
- NT = direct education expenses such as tuition, books, and supplies, net of any scholarship assistance; and
- $Y(s)$ = student income such as residency stipends and summer/part time jobs.

The variable $Y(m)$ is the physician income at which a college graduate is just indifferent, given the required training time to become a physician, the direct costs associated with medical school, and the income that he or she could earn without further schooling, between pursuing a career in medicine and obtaining a job available to a college graduate. As shown in the equation, physician income will be higher as (1) the earnings available to college graduates, $Y(c)$, are higher; (2) the discount or interest rate, r, is

higher; (3) years of medical training, s, are longer; (4) the direct costs of medical education, NT, are higher; and (5) the amount students can earn while in school, Y(s), is smaller.

Although equation (2-1) provides a useful long-run theory of physician income, it omits several potential important determinants of income:

(1) ***Ability***: The formulation in equation (2-1) assumes that there is no ability difference between those who pursue a medical career and those who accept a job after college graduation. If in fact the more able or ambitious continue their schooling, the relevant opportunity income may not be that of college graduates. That is, those individuals who become physicians might have earned more than the average college graduate even without additional schooling.

(2) ***Constant Income Stream***: Equation (2-1) also assumes that both physicians and college graduates earn constant amounts during each year of their working lives. But in fact medicine and many other occupations show inverted-U shaped age-earnings profiles, where earnings first rise with experience, then eventually fall off as the individual approaches retirement age. The time pattern of earnings makes a difference because income earned in later years is more heavily discounted in calculating the lifetime present value of earnings. Other things equal, an individual will prefer an occupation in which more of the income is earned "up front", in the earlier working years.

(3) ***Risk***: Equation (2-1) omits any consideration of risk. Other things equal, a risk-averse individual is willing to trade off some expected income for a more certain income stream. For example, individuals will demand higher earnings to enter occupations that suffer frequent unemployment, such as construction work.

(4) ***Hours worked***: Equation (2-1) is formulated in terms of annual incomes. However, if individuals value leisure time, they will have to earn more to compensate them for working longer hours. One reason physician incomes are higher than in many other occupations may be that they work longer hours, on average, than many other occupations.

(5) ***Changing Physician Population***: Equation (2-1) is formulated in terms of a single physician income. Yet income varies widely among different physicians. For example, physicians with more specialized training earn more on average than general practitioners. Male physicians tend to earn more than female physicians. Middle-aged physicians earn more than young or older physicians. If proportions of the physician population in different specialty, gender, age, or other classes are changing over time, average physician income could be affected.

2.1.2 Empirical Evidence

The persistently high incomes of physicians have attracted attention from policymakers and economists. They have wondered whether the high incomes can be "justified" in terms of the competitive equilibrium theory sketched in the preceeding section. An alternative explanation is that "barriers to entry" into the medical profession, perhaps erected by organized medicine through its control of medical education and licensure, have inflated the incomes of doctors by artificially restricting their supply.

The various studies on the return to medical school education have not reached a consensus on whether the return is excessive. The classic studies of Friedman and Kuznets (1945) and Kessel (1958) pointed to excessive returns due to barriers to entry. More recently, Sloan (1970), Fein and Weber (1971), Mennemeyer (1978), Dresch (1981) and Burstein and Cromwell (1985) found that the return to physician training exceeded that of other occupations. On the other side, Lindsay (1973), Leffler (1978), and Wilson (1987--for United Kingdom physicians) have found roughly competitive returns. Some of the inconsistencies between these studies can be traced to differences in the discount rate and opportunity income used, the adjustments made (e.g., for hours worked), and the sample (e.g., general practitioners versus specialists) and time period. Whether the opportunity income/competitive rate of return theory can explain physician income levels is still an open question.

Moreover, if physicians are earning supra-normal returns, is it because of barriers to entry, short-run disequilibrium, unmeasured individual characteristics, or some other factor?

In addition to the "rate of return" studies, several cross-sectional studies have examined the effects of physician and area characteristics on hourly physician incomes, particularly focussing on the difference in earnings between male and female physicians (Kehrer, 1976; Langwell, 1982a; Langwell, 1982b; Ohsfeldt and Culler, 1986). These studies have found the expected positive effect of specialization, board-certification, and experience on earnings. Specialists in surgery, in particular, have high incomes. In addition, even controlling for these factors, male physicians earn more than female physicians, a difference these authors attribute to discrimination or unmeasured factors. These studies suggest that changes in the age, sex, and specialty mix of physicians will affect average physician income.

2.2 Short-Run Determinants of Physician Income

2.2.1 Conceptual Considerations

Because of the long training time of physicians--four years of medical school and residencies of up to five years--and difficulties in rapidly increasing the number of medical school slots, the supply of physicians responds slowly to changes in their relative income. Even if the opportunity cost theory sketched in Section 2.1 is an adequate theory of long-run income determination, it may not be useful in explaining income fluctuations over shorter time periods. At any particular time, physician income may primarily reflect shorter run forces as the stock of physicians adjusts toward the longer-run equilibrium value.

The following accounting identity is useful in examining the shorter-run determinants of physician income:

$$I \equiv FV - wL - rK - mM, \qquad (2\text{-}2)$$

where:

I = physician income,

F = visit fee,

V = number of visits,

w = non-physician wage rate,

L = non-physician labor employed by physicians,

r = price of capital,

K = amount of capital (office space, equipment, supplies) employed by the practice,

m = price of malpractice insurance, and

M = amount of malpractice insurance purchased by physicians.

Physician net income equals practice revenues minus costs. Revenue is composed of the price of physician services multiplied by the quantity provided and practice costs are composed mostly of expenditures for non-physician aides, office space, malpractice insurance, equipment, and supplies.

Many factors may affect the components of income shown in equation (2-2). More comprehensive insurance coverage for physician services will raise physician fees and the quantity of their services provided (Sloan, 1982). An increase in demand for physician services, perhaps due to rising real incomes, technological advances, population growth, or an aging population, will also increase price and quantity. These trends increase physician income. Conversely, rising practice costs tend to reduce income, especially if fees are regulated so that cost increases cannot be "passed through" to patients or insurance companies. In the 1980s, malpractice insurance premiums, office rents, and salaries of registered nurses have risen rapidly. Cost containment efforts that limit physician fee increases and quantity provided (e.g., through utilization review) will negatively impact physician income. Increasing competition as the physician to population ratio has soared in the last two decades puts downward pressure on price and the quantity supplied per physician.

Some behavioral theories have been developed to explain physician income. The best known is the "target income hypothesis" (see, e.g., Pauly, 1980; U.S. DHEW, 1980). According to this theory, physicians attempt to maintain a "target" income. If their income is reduced, perhaps through fee reductions or an increasing physician to population ratio, they will increase the quantity they provide, or "unbundle" their billings, to maintain their income. In the extreme version of this theory, physicians have unlimited power to "induce" demand and will always maintain their target income. More sophisticated versions of the theory place some constraints on physician behavior: professional ethics, reputation, or insurer monitoring. In these versions, physicians will, or are able to, only partially offset reductions in their incomes.

McGuire (1990) has shown that the target income model can be interpreted in terms of income and substitution effects in a standard model of labor supply. Suppose a physician's fees are reduced. The lower return to his work effort will tend to cause him to work less. This is the <u>substitution</u> effect between work and leisure. Conversely, his lower income will tend to cause the physician to work more. This is the <u>income</u> effect of a fee change. The extreme target income hypothesis can be interpreted as an infinite income effect. That is, the physician will always induce enough demand for his services to return him to his "target" income. Empirically, it is unlikely that the income effect is infinite, so the physician will likely suffer some income loss from fee reductions.

Note that the ability of physicians to induce demand, which is highly controversial, is necessary for the income targetting model to be valid. Another limitation of these theories is that they are usually silent on how the "target" income is determined. Target income models attempt to explain physician responses to fee changes, but they do not explain physician income <u>levels</u>.

2.2.2 Empirical Studies

Empirical studies have documented some of these short-run influences on physician income, as well as movements toward long-run equilibrium. The most significant recent expansion of insurance coverage and demand for physician services occurred with the enactment of the Medicare and Medicaid programs in 1965. Noether (1986) shows that these programs had a substantial positive effect on physician income relative to opportunity cost, which, however, was eroded as the stock of physicians rose rapidly in the 1970s. She also finds that increasing competition decreased physicians' incomes by 19%-45% from 1966 to 1982 relative to what they otherwise would have been.

Cross-sectional studies of physician hourly income have also considered the effect of greater physician supply on income. Results have been somewhat mixed. Kehrer (1976) and Cromwell and Mitchell (1986[a]--in a study of psychiatrists only) find the expected negative effect of the county physician to population ratio on income. Conversely, Langwell (1982[a]) finds a positive association between the physician to population ratio and income. After correcting a physician "wage" equation for the different characteristics of employed and self-employed physicians, Headen (1990) finds a negative relationship between the physician to population ratio and hourly income. Without the correction for selectivity bias, however, there was no relationship. Headen also concludes that 16 percent of the net income of self-employed physicians is a return to entrepreneurship.

Whether physicians can maintain their income by "inducing" demand for their services has been rather inconclusively debated in a large number of studies. Several authors have found a positive relationship between the physician to population ratio and physician fees (see the studies cited in Headen, 1990). Rossiter and Wilensky (1984) also find a positive relationship, but only for ambulatory fees. Using what is probably the most complete specification in the literature, Sloan (1982) finds a negative relationship between physician supply and fees. Other studies have considered

the relationship between physician supply and quantity of services. Auster and Oaxaca (1981) and Cromwell and Mitchell (1986b), for example, find a positive relationship between surgeon availability and number of operations.

Evidence uncovered in some studies of physician fee changes has been interpreted as supporting theories of physician income targeting or ability to induce demand, or to unbundle billings (see, for example, Rice and McCall, 1982; Congressional Budget Office, 1989; Mitchell, Wedig, and Cromwell, 1989). These studies have relied on natural experiments such as the physician fee freezes of the early 1970s or mid-1980s, or the change from multiple Medicare payment localities to a single statewide locality in Colorado in the 1970s.

2.2.3 Studies of Trends in Physician Income

Several studies have examined descriptive trends in physician income from the 1970s into the 1980s, or in the 1980s. Langenbrunner, Williams, and Terrell (1988) studied income changes for five specialties between 1975 and 1983 using the HCFA physician surveys. For all physicians as a group they found that real income was flat over the period. The aggregate trend masked differences by specialty, however. Falling real incomes of primary care specialties (GP/FP, internist, pediatrician) were offset by rising real incomes of surgeons and obstetricians/gynecologists.

Wilke and Cotter (1989) studied the changing practice characteristics of office-based physicians using the AMA physician surveys. Between 1974 and 1986, the unadjusted mean income of office-based physicians increased by 4.7 percent, whereas their unadjusted median income fell by 11.1 percent. The greater rate of growth of mean income than median income indicates that the distribution of physician earnings became more skewed to the right. Colloborating this inference, the 90th percentile of income grew by a rapid 1.18 percent per year, and the standard deviation of income increased by 3 percent per year. Controlling for sex, experience, and FMG status increases the growth rate of income, Wilke and Cotter found. The annual growth rate of

mean income rises to 0.48 percent from 0.38 percent unadjusted. The rate of growth of median income rises from -0.88 percent per year unadjusted to near zero adjusted. The adjusted median income growth rate indicates that the real income of the "typical" physician within sex-FMG-experience category changed very little from 1974 to 1986. The principal reason for the higher adjusted growth rates are that they control for the increasing proportion of females, who tend to earn less. Adding controls for specialty--GP/FP, medical specialists, surgical specialists, and other specialties--has little effect on the adjusted growth rates in income.

Wilke and Cotter found significant differences in income growth by specialty. GP/FPs experienced substantial negative real growth in income between 1974 and 1986; median income fell by 20 percent adjusting for sex, FMG status, and experience. Medical specialists also suffered a drop in real income, but less so than GPs/FPs. Conversely, surgical and "other" specialists (a residual category) both enjoyed significant positive real income growth.

Wilke and Cotter also examined changes in several other practice characteristics, including hourly income, number of office visits, and fees for an office visit with an established patient. Median real net hourly income, adjusted for sex, experience, and FMG status, rose at an annual rate of 0.38 percent, 1974-1986. This is a higher rate of growth than in annual income because of the reductions in hours worked over this period. The number of weekly office visits fell substantially, but the effects of fewer visits on income were offset by rapid increases in real fees.

Schwartz and Mendelson (1990) analyze changes in physicians' workload and income between 1982 and 1987. Using primarily AMA physician survey data, they find that real net income increased for each of eight specialty groups comprising 89 percent of non-resident, patient-care physicians. Growth was highest among surgical specialties, and lowest among GP/FPs, pediatricians, and anesthesiologists. Overall, they find that aggregate net real physician income rose by 30 percent from 1982 to 1987, a period in which the supply of

physicians grew by only 16 percent. They attribute the spurt in physician income in the mid-1980s to an increase in the demand for physician services, noting an aggregate increase in hours worked of 21 percent.

On balance, these studies of trends in physician income indicate that real income was constant or falling from the mid-1970s into the early 1980s, then grew strongly from around 1982 through the mid 1980s. Real income growth was strongest for surgical specialists, weakest for general/family practitioners. Controlling for sex, experience, FMG status, and specialty increases income growth rates, primarily by holding constant the effects of the larger numbers of female physicians, who earn less on average than male physicians.

3.0 DATA AND METHODS

The first three sections of this chapter are a discussion of our primary data source for physician income comparisons, the 1978, 1983, and 1988 HCFA Physicians' Practice Cost and Income Surveys. Section 3.1 is a general description of these surveys. Section 3.2 examines the comparability of the net income and hours worked questions on the HCFA physician surveys over time. Our editing of the income and hours data is also detailed. Section 3.3 analyzes item nonresponse to the net income question in the three HCFA surveys and describes our adjustment for nonresponse.

Section 3.4 then explains the analytic methodology we used to adjust physician income trends for the changing age, sex, FMG status, and specialty mix of the physician population. In the report we supplement data from the HCFA surveys with several other data sources. Section 3.5 describes the American Medical Association physician surveys and income data from the Bureau of the Census's Current Population Survey.

3.1 Description of the 1978, 1983, and 1988 HCFA Physician Surveys

Our primary sources for physician income trends are the National Physicians' Practice Costs and Income Surveys of 1978, 1983, and 1988, conducted by the National Opinion Research Center for HCFA. Each survey was conducted primarily by telephone, using a similar methodology. The sample population for each survey included nonfederal physicians who spent at least 20 hours per week on patient care and had completed their residencies. In other respects, the sampling population of the surveys differed. The 1978 survey sampled physicians in 16 specialties, which are listed in Table 3-1. In addition, physicians had to be either self-employed or employed by another

TABLE 3-1

SPECIALTIES INCLUDED IN THE 1978 HCFA SURVEY OF PHYSICIANS

1. Allergy
2. Anesthesiology
3. Cardiovascular Disease
4. Dermatology
5. Gastroenterology
6. General/Family Practice
7. General Surgery
8. Internal Medicine
9. Neurological Surgery
10. Obstetrics/Gynecology
11. Ophthalmology
12. Orthopedic Surgery
13. Otolaryngology
14. Pediatrics
15. Psychiatry
16. Urology

Source: 1978 HCFA National Physicians' Practice Costs and Income Survey.

physician, and in groups with fewer than 10 full-time* physicians to be included in the 1978 sample. In other words, large-group physicians, and those employed by hospitals, clinics, or HMOs were excluded.

The 1983 survey was the most extensive of the three HCFA surveys of physicians. It sampled physicians in all specialties, in all group sizes, and included physicians employed by hospitals, HMOs, and clinics. The 1988 survey also sampled all specialties and group sizes, but excluded physicians employed by hospitals, clinics, HMOs, and faculty practice plans. Like the 1978 survey, only self-employed physicians or physicians employed by another physician or group of physicians were included.

Because of these differences in sample populations, we can examine 10-year trends in income only for physicians who are self-employed or employed by another physician, in group sizes of 9 or less, and for the 16 specialties shown in Table 3-1. Income trends between 1983 and 1988 can be examined for all specialties and group sizes, but again only for self-employed physicians and physicians employed by another physician.

Response rates to the three HCFA surveys exceeded 60 percent, but fell over time. The weighted response rate to the 1978 survey was about 70 percent, to the 1983 survey was 68 percent, and to the 1988 survey was 61 percent. Response rates varied widely by specialty. For example, in the 1983 survey, completion rates varied from a high of 77 percent among anesthesiologists to 53 percent among cardiologists. Comparisons between respondents and nonrespondents to the 1983 survey failed to find significant differences between respondents and nonrespondents on sex, experience, domestic/foreign medical school, Census region, and urban-rural location (Sprachman et al., 1985, p. 15). Preliminary analysis of response to the 1988 survey indicates that rural physicians are underrepresented. The observation-specific weights calculated by NORC adjust for nonresponse and are used for all analyses in this report.

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*Full-time is defined as being associated with the group for 20 or more hours per week.

The final sample sizes (i.e., number of respondents) of the three HCFA physician surveys are similar. The 1978 survey has the largest number of observations, 5,484. The number of respondents to the 1983 survey was 4,729. However, after we subsetted it to physicians who were self-employed or employed by another physician, the sample size is 3,796. The sample size of the 1988 survey is 3,505.

Since all three databases are surveys, not censuses, of the physician population, values calculated from them are subject to sampling error. We present standard errors with all of our income tabulations. Also, the surveys were not random samples, but stratified samples, with strata defined by specialty, geographic region, and urban-rural location. The sampling weights provided with each survey adjust for the nonrandomness of the sample in addition to nonresponse. We employ them to calculate means that are representative of the physician population. Because of the nonrandom sampling, standard errors should be adjusted for "design effects". However, because the design effects are very small (Sprachman et al., 1985, p. 27), we computed standard errors under the usual simple random sampling assumption for this report. Note, therefore, that mean values are computed weighted by the sampling weights, whereas standard errors are computed unweighted.

3.2 Comparability and Editing of the Physician Income and Hours Worked Questions from 1978, 1983, and 1988 HCFA Surveys

3.2.1 Annual Net Income

The net income questions from the 1978, 1983, and 1988 HCFA physician surveys are reproduced in Exhibits 1, 2, and 3, respectively. The questions in all years request net income after practice deductions, but before taxes. In 1978, the physician is explicitly asked to include retirement contributions with his income. In 1983, he is asked to include bonuses, deferred compensation, and "other forms of compensation". In 1988, the list is even more extensive: salaries, net profit, fringe benefits, bonuses, deferred

EXHIBIT 1

THE NET INCOME QUESTION FROM THE
1978 HCFA PHYSICIAN SURVEY

*60. In which of these broad groups was your own net income from your medical practices in 1978 after practice deductions, including retirement contributions, and before taxes? Was it . . .

1.	less than $20,000,.	01	69-70/
2.	$20,000 to less than $30,000, ...	02	
3.	$30,000 to less than $40,000, ...	03	
4.	$40,000 to less than $50,000, ...	04	
5.	$50,000 to less than $60,000, ...	05	
6.	$60,000 to less than $70,000, ...	06	
7.	$70,000 to less than $80,000, ...	07	
8.	$80,000 to less than $90,000, ...	08	
9.	$90,000 to less than $100,000,.	09	
10.	$100,000 or over?. . . About how much was that? $_____	10	71-77/

EXHIBIT 2

THE NET INCOME QUESTION FROM THE 1983 HCFA PHYSICIAN SURVEY

PHYSICIAN MUST ANSWER Q.64-Q.65

64. In 1983, what was your own net income from all your medical practices after practice deductions, but before taxes? Please include bonuses, deferred income and other forms of compensation.

ENTER EXACT AMOUNT IF GIVEN |__|__|__|__|__|__|__|

IF NOT, We just need a range. Was it above or below . . .

LESS THAN $30,000 01

$30,000 TO LESS THAN $40,000 02

$40,000 TO LESS THAN $50,000 03

$50,000 TO LESS THAN $60,000 04

$60,000 TO LESS THAN $70,000 05

GP/FP, PD, P ---> $70,000

$70,000 TO LESS THAN $80,000 06

$80,000 TO LESS THAN $90,000 07

ALL OTHERS -----> $90,000

$90,000 TO LESS THAN $100,000 08

OG, PATH, ------> $100,000
NEOPER

$100,000 TO LESS THAN $120,000 09

S,R, ANES ------> $120,000
CRS,NUM,NS,
ORS,OT,PLS
N,NCHIN,
TS,U

$120,000 TO LESS THAN $140,000 10

$140,000 TO LESS THAN $160,000 11

$160,000 TO LESS THAN $200,000 12

$200,000 OR OVER ..... (ASK A) 13

A. About how much was that? $_____

EXHIBIT 3

THE NET INCOME QUESTION FROM THE 1988 HCFA PHYSICIAN SURVEY

29. In 1988, what was your own personal net income from all of your medical activities after practice deductions but before taxes, to the nearest thousand? Please include salaries, net profit, fringe benefits, bonuses, deferred income, and other forms of compensation.

(PROBE: Please remember that the confidentiality of all information provided is strictly protected. All identifying information is destroyed and responses are presented only in summary statistical form.)

A. ENTER EXACT AMOUNT IF GIVEN: $ |__|,|__|__|__|,|__|__|__| (D)

B. IF NOT, We just need a range. Was it above or below. . .

LESS THAN $30,000.....01
$30,000 TO LESS THAN $40,000.....02
$40,000 TO LESS THAN $50,000.....03
$50,000 TO LESS THAN $60,000.....04
$60,000 TO LESS THAN $70,000.....05
$70,000 TO LESS THAN $80,000.....06
(D)

GFP, PSY, OTH ----> $80,000

$80,000 TO LESS THAN $90,000.....07
$90,000 TO LESS THAN $100,000.....08
(D)

IMD, GAS OMD ----> $100,000

$100,000 TO LESS THAN $120,000....09 (D)

GSU, RAD, ANS, CTS, CAR, ORS, OPH, URO, OBG, OSU ----> $120,000

$120,000 TO LESS THAN $140,000....10
$140,000 TO LESS THAN $160,000....11
$160,000 TO LESS THAN $200,000....12
$200,000 TO LESS THAN $250,000....13
$250,000 TO LESS THAN $300,000....14
$300,000 TO LESS THAN $350,000....15
$350,000 TO LESS THAN $400,000....16
$400,000 TO LESS THAN $450,000....17
$450,000 TO LESS THAN $500,000....18
(D)
$500,000 OR OVER.....19 (C)

C. About how much was that? $ |___|,|___|___|___|,|___|___|___|

EXHIBIT 3 (continued)

THE NET INCOME QUESTION FROM THE 1988 HCFA PHYSICIAN SURVEY

D. I'd like to verify that this amount <u>includes</u> any contributions to pension, profit sharing, or deferred compensation plans for you during 1988. Is that correct?

Yes.....1 (Q.30)
No.....2 (E)

E. Please re-estimate your own personal net income, <u>including</u> contributions to pension, profit sharing, or deferred compensation plans during 1988.

BOX 18. <u>RECONCILE INCOME</u>

RETURN TO QUESTION 29A THROUGH C TO MAKE NECESSARY MODIFICATIONS. THEN GO TO Q.30.

compensation. Also, a separate question is added to verify the inclusion of contributions to pension, profit-sharing, and deferred compensation plans in income. The expansion of explicitly requested types of compensation could lead to higher reported incomes in later years and an upward bias in the calculated rate of increase of income. Even so, reported net incomes in all years may be biased downwards relative to their true levels if physicians tend to underreport such elements of compensation as deferred income, pensions, and fringe benefits.

The major difference in the income questions is that a range of income was requested in 1978, but an exact amount was recorded if given in 1983 and 1988. If the physician did not provide an exact amount in the latter two years, then a range was requested. A larger number of income ranges (18 versus 12) were provided in the 1988 survey than in the 1983 survey. In all years, an exact amount was requested for incomes exceeding the highest range of incomes.

For the 1978 survey, we recoded the income ranges to their midpoints. For example, if a physician reported having an income of $50,000 to $60,000, we recorded his income as $55,000. Unfortunately, on the actual 1983 data tape, only the ranges of income are available, not the exact amounts. Apparently, NORC recoded all exact amounts into the ranges. As with the 1978 survey, we recoded these ranges to their midpoints. To maintain comparability over time, we also recoded the exact 1988 incomes into the midpoints of the ranges, as well as the incomes that were only available as a range. After recoding, mean income was consistently slightly higher than before, by specialty, urban-rural, regional, sex, and other breakdowns. For the entire sample and many of the decompositions, mean income rose by about 2 percent.

The reason for the increase in calculated income appears to be bunching of reported incomes at the endpoints of ranges, which are then recoded up to the midpoints. For example, if a physician reports an income of $70,000 or $400,000, it is recoded to $75,000 or $425,000, respectively, which are the midpoints of the relevant ranges. The upward bias caused by the recoding of

ranges is not very significant, and we judged that it was warranted to maintain comparability with 1978 and 1983.

Aside from recoding income ranges to their midpoints, little editing of the income data was done. Based on verbatim responses, three 1988 incomes were set to missing as inaccurate, and 9 incomes were recoded. For example, one physician reported his income as $1,000, but it was clear from the verbatim responses that $100,000 was intended. The highest reported incomes in each year were examined for accuracy, but in no case did deleting or recoding them appear to be warranted.

3.2.2 Hourly Net Income

In this report, we consider trends in hourly income as well as annual income. Hourly income is annual income divided by the product of weeks worked per year and hours worked per week. The hours worked questions were different in 1988 than in the previous two surveys. In 1978 and 1983, administrative and medical hours worked were requested in separate questions; we summed them to obtain total hours worked. In 1988, on the other hand, the physician was asked directly for his total hours worked. In surveys, respondents tend to report larger totals when they are asked to specify components of the total. Thus, it is likely that the total obtained by summing administrative and medical hours (in 1978 and 1983) is biased up relative to the total obtained directly (in 1988). This bias, if it exists, biases up the 1988 hourly incomes relative to earlier years, and may cause us to overstate the rate of growth in hourly income between earlier years and 1988.

In each survey, the physician was asked to report the number of hours he had worked during the last week. Then he was asked whether that number of hours was more or less than average and whether hours worked had changed in the last year. To avoid inaccurate hourly incomes, we excluded physicians who responded that they had worked an atypical number of hours in the last week or had changed their number of hours worked in the last year. This edit substantially reduces sample sizes for the hourly income analyses compared to

the annual income analyses. We also excluded the hourly incomes of physicians who reported working less than 20 or more than 130 hours per week, or less than 5 or more than 52 weeks per year.

3.3 Item Nonresponse to the Net Income Question on the HCFA Physician Surveys

The sampling weights for the HCFA physician surveys provided by NORC adjust for nonresponse to the entire questionnaire. They do not adjust for item nonresponse to the net income question. Among the respondents to the questionnaires, if the physicians who answered the net income question differ systematically from those who did not answer it, a biased picture of physician income could emerge, even when weighting by the NORC sampling weights. There is some evidence that probability of nonresponse to income questions is correlated with higher income (Wilke and Cotter, 1989, footnote 14). If this is true for physicians, measured physician income at any time would be biased downward, although rates of change might still be unbiased.

Response rates to the net income question on the HCFA surveys are given in Table 3-2. These are item response rates among physicians who responded to the survey. Because the NORC sampling weights adjust for nonresponse to the entire survey, these item response rates are unweighted. In 1983, physicians who were employed by a hospital, clinic, or HMO were excluded from the tabulations, because they are not included in our income trend analysis.

Although overall response rates to the HCFA physician surveys have been falling (see Section 3.1), item response rates to the net income question have risen substantially over time. Less than 80 percent of physicians responding to the survey answered the net income question in 1978, but more than 90 percent did so in 1988. Moreover, item response to the net income question rose among all the physician subgroups we consider.

For each year, income response rates among subgroups were similar to overall item response, but there were statistically significant differences within certain categories. Female physicians were more likely to answer the income question than male physicians (statistically significant in 1978 and

TABLE 3-2

PERCENTAGE OF RESPONDENTS TO THE 1978, 1983, AND 1988 HCFA PHYSICIAN SURVEYS THAT ANSWERED THE NET INCOME QUESTION, BY CHARACTERISTIC

Specialty	1978	1983	1988
Overall	*77.1%*	*82.8%*	*91.7%*
Age			
< 36 years	79.0	85.2	92.8
36-45 years	77.7	82.6	91.6
46-66 years	76.1	82.8	90.6
56-65 years	76.7	80.9	91.7
> 65 years	77.0	82.2	94.7
Sex			
Male	76.8*	82.5*	91.6
Female	84.6	87.4	93.4
Race			
White	N/A	83.8	91.4
Hispanic	N/A	83.7	94.9
Black	N/A	81.9	94.3
Asian	N/A	81.3	93.9
American Indian	N/A	100.0	88.9
Medical School			
Domestic	77.2	83.1	91.6
Foreign	76.5	81.7	92.6
Board-Certified			
No	77.9	84.7*	94.3*
Yes	76.7	81.9	90.8
Region			
Northeast	73.0*	80.7	89.4*
Midwest	76.5	82.9	91.5
South	80.4	83.0	91.8
West	78.7	84.6	93.8
Urban/Rural			
Nonmetropolitan	79.6*	83.0	94.2*
Metropolitan	76.5	82.8	90.9
Group Size			
1	77.3	83.7*	93.1*
2-4	77.1	84.3	90.9
5-9	75.5	79.6	88.8
10+	N/A	77.8	91.3
Specialty			
GP/FP	77.5*	88.4*	94.9*
Med. Spec.	78.4	83.4	93.5
Surg. Spec.	73.4	82.0	89.8
Other	84.8	80.2	91.0

N/A = not available or applicable.

Note: Based on unweighted cross-tabulations. Includes only physicians who are self-employed or employed by another physician.

*Chi-square statistic for null hypothesis of independence of response/nonresponse from characteristic is statistically significant at the five percent level or better for this characteristic/year.

Source: HCFA Physician Practice Cost and Income Surveys, 1978, 1983, and 1988.

1983), board-certified physicians were less likely to respond to the income question (significant in 1983 and 1988), Northeastern physicians were less likely to provide incomes (regional effects significant in 1978 and 1988), nonmetropolitan physicians were more likely to respond than metropolitan physicians (significant in 1978 and 1988), and larger group physicians were less likely to provide incomes than solo or small group physicians (group size effects significant in 1983 and 1988). Even when statistically significant, the absolute differences within category are small. For example, board certified physicians were only 2.8 percentage points less likely to respond than non-board-certified physicians in 1983 (81.9% versus 84.7%).

Specialty differences in response rates are statistically significant in each year. In particular, surgical specialists, who have high average incomes, were less likely to answer the income question than general practitioners or medical specialists. Not correcting for differential response by specialty will bias mean physician income downwards. Many of the other variations in response seem to be correlates of specialty. For example, surgeons are disproportionately male and board certified, and male and board certified physicians are less likely to provide incomes. This suggests that correcting for differential response by specialty will simultaneously correct for differential response by other characteristics.

Because of the apparent importance of response to the net income question by specialty, we tabulated item response rates by a more detailed, 18 specialty decomposition. This is presented in Table 3-3. Item response to the net income question is generally lower among the higher-income specialties. For example, in 1988, cardiologists, orthopedic surgeons, ophthalmologists, cardiovascular/thoraic surgeons, anesthesiologists, and radiologists, all high-earning specialties, have among the lowest response rates. Conversely, the lower-earning general practitioners, internists, pediatricians, and psychiatrists provided incomes at the highest rates. Mean income will be biased downwards unless the greater tendency of lower-earning doctors to report net incomes is adjusted for.

TABLE 3-3

PERCENTAGE OF RESPONDENTS TO THE 1978, 1983, AND 1988 HCFA PHYSICIAN SURVEYS THAT ANSWERED THE NET INCOME QUESTION, BY DETAILED SPECIALTY

Specialty	1978	1983	1988
General/Family Practice	77.5%	88.4%	94.9%
Medical Specialties			
Internal Medicine	74.5	84.6	95.5
Cardiology	71.3	75.0	88.7
Pediatrics	86.5	84.2	97.7
Gastroenterology	73.3	89.1	91.7
Other Medical Specialties	74.1	84.8	91.3
Surgical Specialties			
General Surgery	75.6	85.7	91.4
Orthopedic Surgery	64.5	79.9	89.9
Ophthalmology	68.4	81.8	86.0
Urology	74.1	83.4	91.2
Obstetrics/Gynecology	75.2	79.6	91.1
Cardiovascular/ Thoracic Surgery	N/A	80.7	85.7
Other Surgical Specialties	73.2	81.2	91.6
Other Specialties			
Psychiatry	85.4	87.0	94.2
Anesthesiology	81.9	80.1	88.9
Radiology	N/A	71.1	86.0
Pathology	N/A	82.1	86.7
Other Specialties	N/A	82.7	96.6

N/A = not applicable.

Note: The chi-square statistics for the null hypothesis of independence of response/nonresponse from specialty are statistically significant at the one percent level in all three years. Based on unweighted crosstabulations. Includes only physicians who are self-employed or employed by another physician.

Source: HCFA Physician Practice Cost and Income Surveys, 1978, 1983, 1988.

We adjusted for item nonresponse to the net income question through the following procedure:

(1) For each year, the NORC sampling weights were summed by specialty for each of the 18 specialty groups listed in Table 3-3. Call this sum S;

(2) Then the weights of the physicians within each specialty who answered the income question were summed. Call this sum R;

(3) Next, the weight of each physician who responded to the income question was inflated by the ratio of the sum of weights for his specialty to the sum of weights for income respondents within his specialty. That is, $w_i' = (S/R)w_i$, where w_i' is the new weight for physician i, and w_i is the original NORC sampling weight;

(4) Finally, the weights were renormalized to sum to the number of observations in each year.

Essentially, the sample weights of physicians who answered the net income question are inflated so that their responses are representative of all physicians in that specialty who responded to the survey. For example, if half the radiologists who responded to the survey answered the income question, the weight of each of the income respondents would be doubled so that their responses represent the incomes of all radiologists who responded to the survey. The original NORC sampling weights then weight the survey respondents' answers to be representative of the population of physicians.

Our correction for item nonresponse assumes no income difference within specialty between physicians who answered the income question and those who did not. A similar assumption of no differences between respondents and nonrespondents is made in developing the NORC sampling weights that correct for nonresponse to the entire survey. The adjustment for item nonresponse to the net income question raises mean net income for the entire sample from $62,747 to $63,334 (0.9%) in 1978, $102,775 to $103,645 (0.8%) in 1983, and $160,261 to $161,813 (1.0%) in 1988 (when exact income values are recoded to midpoints of ranges). Mean income within the 18 specialty groups is not affected by this adjustment, of course.

The question remains of whether adjusting for differential specialty response to the income question is sufficient to correct differential response on other characteristics such as sex, board certification, region, urban-rural, and group size. To test this, we computed three-way crosstabulations of respondents/nonrespondents to the income question by other characteristic holding specialty constant. Holding the 18 specialties constant, the chi-square statistic for independence of response/nonresponse by characteristic was statistically significant at the 5 percent level in only 16 of 248 (6%) of the contingency tables. Since 5 percent, or about 12 tests, are expected to be significant just by chance, we conclude that correcting for nonresponse by specialty alone effectively corrects for nonresponse by other characteristics. Any further adjustment of the weights by other characteristics would have a very marginal effect and is not worth the added complexity.

3.4 Adjustments to Income Trends for Age, Sex, FMG Status, and Specialty Mix

Mean physician income differs by specialty, age or experience, sex, and FMG status. Changes in the proportion of physicians in these groups could therefore cause changes in mean physician income over time. We used a regression adjustment method to examine physician income trends holding constant specialty, age, sex, and FMG status.

A caveat about adjusted income trends is worth mentioning. If physicians self-select into better paying alternatives, then holding constant factors such as specialty could cause increases in income to be understated. The reason is as follows. Suppose that a higher proportion of physicians are choosing to enter higher-paying specialties over time. But perhaps these physicians, because of their native abilities or ambition, would have earned higher net incomes even if they had not entered more remunerative specialties. Then, attributing the higher income to the specialty choice by holding it constant incorrectly lowers measured income growth.

Income possibilities have been shown to affect physician specialty and location choices (Wilke and Cotter, 1989), so this is not an idle concern. The potential bias can be minimized by holding constant only exogenous characteristics such as age, sex, and race. While acknowledging some possible bias, we also hold constant FMG status and specialty mix because these characteristics are important influences on income and are exogenous to most of the physician population over short periods of time. We also present some sensitivity results holding constant board certification, groupsize, and urban-rural and regional location. However, since the potential for bias grows as more characteristics are held constant, in most of our results we control for only age, sex, FMG status, and specialty.

The regression adjustment is computed with the three HCFA physician surveys. Using a pooled dataset of all three years, adjusted income trends are calculated by estimating the following equation:

$$Y(i) = a0 + a1*SPECIALTY(i) + a2*AGE(i) + a3*SEX(i) + a4*FMG(i) + a5*t(1983) + a6*t(1988), \quad (3\text{-}1)$$

where:

Y(i)	=	net income of the ith physician (in 1988 dollars),
a0, a1, a2, a3, a4, a5, and a6	=	coefficients to be estimated,
SPECIALTY(i)	=	a vector of variables identifying the specialty of physician i,
AGE(i)	=	a vector of variables giving physician i's age (at the time he was surveyed),
SEX(i)	=	a binary variable equaling one if physician i is female,
FMG(i)	=	a binary variable equaling 1 if physician i graduated from a foreign medical school,
t(1983)	=	a binary variable equaling 1 if the observation is from 1983, and
t(1988)	=	a binary variable equaling 1 if the observation is from 1988.

The coefficients a5 and a6 of the two time dummy variables, t(1983) and t(1988), give the average change in real physician income from 1978 to 1983, and from 1978 to 1988, respectively, adjusted for the changing specialty, age, sex, and FMG mix of the physician population. Using 1978 mean income as a base, adjusted rates of change from 1978 to 1983 and from 1978 to 1988 are calculated. The 1983-88 change is obtained by subtracting the 1983 coefficient from the 1988 coefficient and rates of change are calculated using 1983 income as a base. Unadjusted rates of change for comparison to the adjusted rates are calculated by deleting the specialty, age, sex, and FMG variables from equation 3-1. Additional characteristics can be held constant by adding them to equation 3-1.

3.5 American Medical Association and Current Population Survey Income Data

In addition to the HCFA physician surveys, we employ data from the American Medical Association physician surveys to document trends in physician income. An advantage of the AMA surveys is that they are conducted annually and so provide a more detailed trendline of physician income than is available from the HCFA surveys. The Socioeconomic Monitoring System (SMS) surveys, used by the AMA since 1981, are similar to the HCFA surveys. The sample universe is nonfederal patient care physicians who have completed their residency and who spend 20 hours or more a week in patient care. Response rates have ranged from 57 percent in 1983-85 to 66 percent in 1988. Beginning with the 1989 edition of the AMA's Socioeconomic Characteristics of Medical Practice, data presented from all years of the SMS are weighted to account for nonresponse. We present only these weighted data.

The AMA net income question is very similar to those used on the HCFA surveys. However, the income data reported in Socioeconomic Characteristics of Medical Practice are apparently not weighted to adjust for item nonresponse to the net income question. This could lead to a downward bias in the AMA's reported net income figures (see the discussion in Section 3.3 above).

The predecessor to the Socioeconomic Monitoring System was the Periodic Survey of Physicians (PSP), which did not include hospital-based physicians.

There are also some (relatively minor) differences in survey procedures and income questions between the SMS and PSP. Thus, AMA physician income figures are not strictly comparable before and after 1981. For this reason, we generally restrict ourselves to AMA-reported incomes for 1982 to 1988. (Data for 1988 were the most recent available when this report was written).

The Medical Economics survey is a third source of data on physician income. This magazine conducts an annual mailed survey of private, office-based physicians. For the survey of 1989 incomes, questionnaires were mailed to a random sample of 31,976 physicians; 9,762 physicians, or 31 percent, responded. Unlike the HCFA and AMA surveys, which both use the AMA Masterfile of physicians as the sampling frame, Medical Economics samples from a master list maintained by Clark-O'Neill Fisher-Stevens, Inc.

We decided that income tabulations from the HCFA or AMA surveys were preferrable to those from the Medical Economics survey, for several reasons. First, response rates to the HCFA and AMA surveys are roughly twice as high. Second, the HCFA and AMA surveys are completed by telephone, rather than by mail, and are likely to be more accurate for that reason. Third, the HCFA and AMA surveys appear to use a more sophisticated statistical methodology and are better documented. For these reasons, we do not present findings from the Medical Economics surveys in this report. Nevertheless, it is interesting to note that income trends reported by Medical Economics in its September 3, 1990 issue are generally consistent with those revealed by the HCFA and AMA data.

The HCFA, AMA, and Medical Economics surveys gather information only on physician incomes. Trends in physician income relative to those of other occupations are also of interest. For comparative purposes, we utilize data from the Current Population Survey. The Current Population Survey (CPS) is an annual survey of the civilian, noninstitutionalized population conducted by the Bureau of the Census in conjunction with the Bureau of Labor Statistics. Income tabulations by occupation, education, and sex are reported in the Bureau of the Census's Current Population Reports series. The CPS relies on respondents to report their own occupation, and mean or median incomes tabulated from the CPS tend to be well below those calculated from surveys

such as the HCFA or AMA surveys. However, the CPS does allow trends in income among different occupational groups to be compared using a consistent methodology. More details on the CPS comparisons are given in Section 4.3.

4.0 TRENDS IN PHYSICIAN NET INCOME

This chapter presents trends in physician net income from 1978 to 1988. Section 4.1 considers trends in income and selected practice characteristics from 1982 to 1988 measured by the American Medical Association's Socioeconomic Monitoring System, an annual sample survey of physicians. Section 4.2 analyzes net income as measured for three years, 1978, 1983, and 1988, by the HCFA Physician Practice Cost and Income Surveys. Section 4.3 concludes the chapter by presenting comparative income trends of several occupational and educational groups from 1982 to 1989 using the Census Bureau's Current Population Survey data.

4.1 Annual Trends in Income and Selected Practice Characteristics 1982-1988 Using AMA Data

4.1.1 Trends in Net Income

The AMA's Socioeconomic Monitoring System (SMS) provides a convenient and detailed annual picture of trends in physician practice. Results from the annual SMS surveys are reported in the AMA's Socioeconomic Characteristics of Medical Practice. The trends presented in this section are from the 1989 edition of that publication. The population from which samples are drawn includes active nonfederal patient care physicians, excluding residents. Since they are tabulated from a sample survey, not a census, the AMA data are subject to nonresponse bias and sampling error. The AMA weights the data to adjust for nonresponse, and also provides standard errors of the estimated means. To keep our trend tables simple, we have chosen not to include standard errors, but it should be recognized that the AMA statistics are estimates, not exact numbers. Where appropriate, we comment on sampling variability. However, because the AMA does not publish sample sizes for the various estimates, we cannot compute tests of statistical significance.

Table 4-1 shows trends from 1982 to 1988 in mean physician net income after expenses but before taxes, by specialty. The top panel gives income in

TABLE 4-1

MEAN PHYSICIAN NET INCOME, IN THOUSANDS OF DOLLARS, BY SPECIALTY, 1982-88, NOMINAL AND REAL DOLLARS

I. NOMINAL (CURRENT) DOLLARS

Specialty	1982	1983	1984	1985	1986	1987	1988	Percent Change 1982-88
All	*$97.7*	*$104.1*	*$108.4*	*$112.2*	*$119.5*	*$132.3*	*$144.7*	*48.1%*
General/Family Practice	71.4	66.9	71.6	77.9	80.3	91.5	94.6	32.5
Medical Specialties[a]	86.9	94.6	104.2	102.0	109.4	121.8	130.9	50.6
Surgery	128.6	144.3	151.0	155.0	162.0	187.0	207.0	61.0
Pediatrics	70.5	70.8	73.7	76.2	81.8	85.3	94.9	34.6
Obstetrics/Gynecology	112.3	118.1	118.8	124.3	135.9	163.2	180.7	60.9
Radiology	133.3	144.3	139.7	144.3	168.8	180.7	184.6	38.5
Psychiatry	75.8	79.2	85.1	87.2	91.5	102.7	111.4	47.0
Anesthesiology	131.9	141.6	143.9	142.7	150.2	163.1	194.5	47.5

II. CONSTANT 1988 DOLLARS

All	*$119.8*	*$123.7*	*$123.5*	*$123.3*	*$128.9*	*$137.7*	*$144.7*	*20.8%*
General/Family Practice	87.5	79.5	81.6	85.6	86.6	95.3	94.6	8.1
Medical Specialties[a]	106.5	112.4	118.7	112.1	118.0	126.8	130.9	22.9
Surgery	157.7	171.4	172.0	170.3	174.8	194.7	207.0	31.3
Pediatrics	86.4	84.1	83.9	83.7	88.3	88.8	94.9	9.8
Obstetrics/Gynecology	137.7	140.3	135.3	136.6	146.6	169.9	180.7	31.2
Radiology	163.4	171.4	159.1	158.6	182.1	188.1	184.6	13.0
Psychiatry	92.9	94.1	96.9	95.8	98.7	106.9	111.4	19.9
Anesthesiology	161.7	168.2	163.9	156.8	162.1	169.8	194.5	20.3

[a]Excludes pediatricians.

Note: Includes active nonfederal patient care physicians, excluding residents. Income from medical practice after expenses but before taxes. Values are calculated from a sample of physicians and thus are subject to sampling error.

Source: American Medical Association, Socioeconomic Characteristics of Medical Practice, 1989, Table 43. U.S. Bureau of Labor Statistics, Consumer Price Index for All Urban Consumers.

current dollars; the bottom panel is in constant (inflation-adjusted) 1988 dollars. Over the six years 1982-1988, average net income rose by nearly 50 percent, from $97,700 to $144,700. Over half of this gain can be attributed to "staying even" with inflation, but even on a constant dollar basis, physician earnings rose by a strong 20.8 percent. Real income was nearly constant from 1982 through 1985, but increased sharply from 1985 to 1988. Since the standard errors of the AMA all-physician income estimates are $1,000 to $2,000, the increases after 1985 are statistically significant.

The real income of all specialties grew, but there were large differences in income gains by specialty. Surgeons and obstetricians/gynecologists enjoyed the largest percentage income gains, gaining 61 percent in nominal dollars and 31 percent in real terms. Surgeons' average income rose by nearly $80,000 from 1982 to 1988, the largest absolute gain of any specialty group. By 1988, they averaged over $200,000 in income, surpassing radiologists and anesthesiologists, whom they had slightly trailed in 1982. By 1988, surgeons were netting over double the income of general/family practitioners and pediatricians. The $68,000 net income gain of obstetricians/gynecologists from 1982 to 1988 is especially noteworthy because of their rising malpractice insurance expenses. Apparently, they were able to pass their increased expenses on to payors without an effect on their bottom line.

The primary care specialties of general/family practice and pediatrics lagged in absolute and percentage income gains. GPs/FPs gained only about 33 percent, or $23,000, in average income from 1982 to 1988. This is about half the percentage gain and one-quarter the absolute gain of surgeons. In real terms, their income rose only 8 percent. Although their real incomes rose, the GPs/FPs and pediatricians lost substantially relative to their more specialized colleagues from 1982 to 1988.

Because the physician income distribution is skewed to the right, the median provides a better picture of the income of a "typical" physician than the mean income. Half of physicians have an income exceeding the median, and half have an income falling short of the median. Table 4-2 is analogous to Table 4-1, but it presents median net income by specialty instead of mean

TABLE 4-2

MEDIAN PHYSICIAN NET INCOME, IN THOUSANDS OF DOLLARS, BY SPECIALTY, 1982-88, NOMINAL AND REAL DOLLARS

I. NOMINAL (CURRENT) DOLLARS

Specialty	1982	1983	1984	1985	1986	1987	1988	Percent Change 1982-88
All	*$82*	*$88*	*$92*	*$94*	*$100*	*$108*	*$120*	*46%*
General/Family Practice	63	60	64	70	75	80	85	35
Medical Specialties[a]	75	83	90	90	95	100	109	45
Surgery	110	124	128	129	141	153	180	64
Pediatrics	62	62	67	70	75	77	85	37
Obstetrics/Gynecology	107	104	110	120	127	145	150	40
Radiology	120	128	122	135	155	170	158	32
Psychiatry	68	70	80	80	82	90	97	43
Anesthesiology	120	137	145	133	149	150	180	50

II. CONSTANT 1988 DOLLARS

All	*$101*	*$105*	*$105*	*$103*	*$108*	*$112*	*$120*	*19%*
General/Family Practice	77	71	73	77	81	83	85	10
Medical Specialties[a]	92	99	102	99	103	104	109	19
Surgery	135	147	146	142	152	159	180	33
Pediatrics	76	74	76	77	81	80	85	12
Obstetrics/Gynecology	131	124	125	132	137	151	150	15
Radiology	147	152	139	148	167	177	158	8
Psychiatry	83	83	91	88	89	94	97	17
Anesthesiology	147	163	165	146	161	156	180	22

[a]Excludes pediatricians.

Note: Includes active nonfederal patient care physicians, excluding residents. Income from medical practice after expenses but before taxes. Values are calculated from a sample of physicians and thus are subject to sampling error.

Source: American Medical Association, Socioeconomic Characteristics of Medical Practice, 1989, Table 48, U.S. Bureau of Labor Statistics, Consumer Price Index for All Urban Consumers.

income. In 1988, the median physician net income was $120,000, compared to a mean of $145,000. The percentage rate of growth of median income from 1982 to 1988 was almost identical to the rate of growth of mean income--46 versus 48 percent. Moreover, there were few differences in growth rates by specialty, except for a slower growth of median than mean income for obstetricians/gynecologists. However, the "typical" physician's income, as measured by the median, rose only $38,000 over the six year period, compared to a $47,000 increase in average income.

Table 4-3 shows trends in mean real physician net income from 1982 to 1988, by metropolitan/nonmetropolitan location and age. Although the real incomes of both urban and rural physicians increased, AMA data show a smaller absolute and percentage net income growth for nonmetropolitan than metropolitan physicians over the six year period. However, the slower percentage income growth of rural physicians may not be statistically significantly different from the income growth of urban physicians. Average incomes of physicians in smaller metropolitan areas seem to have increased the fastest, but again, this may not be a statistically significant finding. The average net incomes of all age groups rose, but the oldest and youngest physicians seem to have enjoyed a higher percentage rate of increase than middle-aged physicians. Smaller sample sizes at the extreme ages increase the uncertainty of the estimates, so this hypothesis should be regarded with some caution.

4.1.2 Trends in Practice Expenses, Work Effort, and Patient Contacts

We now turn from examining trends in net income to a brief consideration of trends in certain practice characteristics that may be related to changes in income. Net income is the difference between gross revenue and practice expenses. Therefore, net income could rise either because of an especially rapid growth in gross revenue, or because of slow growth of practice expenses.

Table 4-4 presents trends in the practice expenses of self-employed physicians, by category, from 1982 to 1988. Overall practice expenses grew

TABLE 4-3

MEAN REAL PHYSICIAN NET INCOME, IN THOUSANDS OF 1988 DOLLARS, BY METROPOLITAN/NONMETROPOLITAN LOCATION AND AGE, 1982-88

	1982	1983	1984	1985	1986	1987	1988	Percent Change 1982-88
All	*$119.8*	*$123.7*	*$123.5*	*$123.3*	*$128.9*	*$137.7*	*$144.7*	*20.8%*
Location								
Nonmetropolitan	106.5	103.2	104.0	102.5	116.2	122.7	120.9	13.5
Metropolitan								
< 1 mil.	124.4	129.1	131.2	128.8	134.3	146.2	154.1	23.8
1 mil. +	118.6	123.3	121.1	122.6	126.8	133.1	140.7	18.7
Age								
< 36 years	86.9	91.8	90.7	92.6	97.1	100.0	108.0	24.2
36-45 years	129.3	126.8	133.7	127.2	134.2	144.5	152.2	17.7
46-55 years	141.1	154.3	143.5	146.8	151.3	158.1	166.8	18.2
56-65 years	119.8	120.1	117.5	123.0	129.2	136.6	140.6	17.4
66+ years	76.6	85.5	93.1	97.4	89.6	99.6	102.3	33.5

Note: Includes active, nonfederal patient care physicians, excluding residents. Income from medical practice after expenses but before taxes. Values are calculated from a sample of physicians and thus are subject to sampling error.

Source: American Medical Association, Socioeconomic Characteristics of Medical Practice, 1989, Table 43. U.S. Bureau of Labor Statistics, Consumer Price Index for All Urban Consumers.

TABLE 4-4

MEAN PRACTICE EXPENSES OF SELF-EMPLOYED PHYSICIANS, IN THOUSANDS OF DOLLARS, BY CATEGORY, 1982-88

Category	1982	1983	1984	1985	1986	1987	1988	Percent Change 1982-88
Total	$78.4	$85.4	$94.0	$102.7	$118.4	$123.7	$140.8	79.6%
Nonphysician personnel	30.1	29.0	31.2	35.6	38.8	42.5	48.4	60.8
Office	17.8	21.2	24.4	26.4	28.5	30.0	34.0	91.0
Medical supplies	7.6	9.3	10.7	11.2	13.2	13.5	14.5	90.8
Malpractice	5.8	6.9	8.4	10.5	12.8	15.0	15.9	174.1
Medical equipment	5.1	5.1	5.5	5.9	7.0	6.5	6.9	35.3

Note: Includes active nonfederal patient-care physicians, excluding residents. Values are calculated from a sample of physicians and thus are subject to sampling error.

Source: American Medical Association, Socioeconomic Characteristics of Medical Practice, 1989, Tables 34, 37, 38, 39, 40, and 41.

quite rapidly, by $62,000, or 80 percent, over the six year period. Malpractice insurance premiums increased especially rapidly, and above-average increases in office rents and medical supplies also contributed to higher practice costs. Practice expenses grew at a more rapid rate than the 48 percent growth in net income. They also increased more rapidly than the overhead and malpractice components of the Medicare Economic Index (see Section 5.2 below), which is an index of physicians' practice costs. Some of the practice cost growth, therefore, represents greater quantities of practice inputs used by physicians, not higher prices for practice inputs. In short, net income did not increase from 1982 to 1988 because of slow growth in physicians' practice expenses. Rather, net income must have grown because of an especially rapid increase in gross revenues per physician.

One reason gross revenue might rise is that physicians are working longer hours, and seeing more patients. Table 4-5 presents trends in work effort and patient contacts from 1982 to 1988. Weeks practiced rose slightly over the period, but peaked in 1985. Hours in professional activities and patient care also rose (these increases seem to be statistically significant), but the increase in work effort is not large enough to account for the 21 percent gain in real income. Real compensation per physician hour worked must have risen substantially over this period.

Total patient contacts actually fell by a statistically significant 6.2 percent from 1982 to 1988.* After falling from 1982 to 1984, then rising from 1984 to 1988, the number of office visits was about the same in 1988 as in 1982. Visits on hospital rounds fell sharply after 1983, reflecting the marked shift to the outpatient setting that occurred in the mid-1980s. In spite of reduced inpatient activity, the mean number of surgical procedures per physician rose by a statistically significant amount as ambulatory surgery skyrocketed in the 1980s (see Section 5.5 below).

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*Total patient contacts excludes radiologists, psychiatrists, anesthesiologists, and pathologists.

TABLE 4-5

MEAN PHYSICIAN WORK EFFORT AND PATIENT CONTACTS, 1982-88

	1982	1983	1984	1985	1986	1987	1988	Percent Change 1982-88
Work Effort								
Weeks practiced per year	46.6	46.9	47.1	47.6	47.5	47.1	47.1	1.1%
Hours in professional activities per week	57.0	57.6	57.5	57.1	57.7	58.3	58.2	2.1
Hours in patient care per week	51.3	51.8	51.5	51.3	52.2	52.9	53.1	3.5
Patient Contacts								
Total patient visits per week[a]	129.1	123.4	118.1	117.1	117.7	119.3	121.1	-6.2
Office visits per week[a]	80.2	77.4	73.0	73.5	75.7	77.0	79.2	-1.2
Visits on hospital rounds per week[a]	32.3	32.9	28.4	27.2	25.8	25.1	24.8	-23.2
Surgical procedures per week[a]	3.1	3.3	3.2	3.0	3.5	3.5	3.5	12.9

[a]Excludes radiologists, psychiatrists, anesthesiologists, and pathologists.

Note: Includes active, nonfederal patient care physicians, excluding residents. Values are calculated from a sample of physicians and thus are subject to sampling error.

Source: American Medical Association, Socioeconomic Characteristics of Medical Practice, 1989, Tables 2, 4, 6, 16, 18, 20, and 22.

These data indicate that higher net income per physician cannot be attributed to a larger number of patient contacts per physician. Rather, physicians must be providing more services per contact, receiving higher reimbursement for providing the same services, and/or providing a more profitable mix of services. We will analyze these issues further in Chapter 5.

4.2 Self-Employed Physician Income 1978, 1983, 1988: Results from the HCFA Physician Surveys

This section presents descriptive trends in self-employed physician net income from the HCFA Physician Practice Cost and Income Surveys of 1978, 1983, and 1988. Five basic tables are presented:

(1) Mean annual net income by specialty;

(2) Mean real annual net income by specialty;

(3) Mean real annual net income by age, sex, race, FMG status, geographic location, and groupsize;

(4) Mean real hourly net income by specialty; and

(5) Mean real hourly net income by age, sex, race, FMG status, geographic location, and groupsize.

The sample for the 1978 HCFA survey included physicians in only 16 specialties, and excluded physicians in groups of larger than 9. In total ten tables are presented in this section: five showing income in 1978, 1983, and 1988 for the restricted 1978 sample of physicians, and five showing income in 1983 and 1988 for the all specialties and group sizes sample. In the 1983/1988 tables, several specialties in addition to those shown in the 1978/1983/1988 tables are broken out: cardiovascular/thoracic surgery, radiology, pathology, and emergency medicine. Also, income decompositions by race and for group sizes greater than 9 are given in the 1983/1988 tables.

Like the AMA's physician surveys, HCFA's surveys sampled active, nonfederal, patient care physicians, excluding residents. Unlike the AMA surveys, the 1978 and 1988 HCFA surveys were restricted to physicians who were

self-employed or employed by another physician. Physicians employed by hospitals, HMOs, or clinics were excluded. In all tables discussed in this section, the sample is restricted to physicians who are self-employed or employed by another physician. Hence, the income figures presented in this section are not comparable to the AMA income figures discussed in Section 4.1, which include employees of hospitals, HMOs, and clinics.

In each table, mean income, its standard error, and the sample size upon which it is based are presented. All means have been weighted to adjust for the nonrandomness of the survey sample, nonresponse to the survey, and item nonresponse to the net income question (see Chapter 3). Ten year (1978-1988) and five year (1983-1988) percentage changes in income are shown by category. Whether the percentage change is significantly different from zero (based on a two-tailed t-test for the difference of means) is indicated.

Section 4.2.1 discusses 5 and 10 year trends in annual income, and Section 4.2.2 discusses trends in hourly income. In each section, the 1978/1983/1988 and the 1983/1988 tables are discussed jointly. The 1983/1988 table has the same number as the 1978/1983/1988 table, but is differentiated with an "a." For example, Table 4-6a is the 1983/1988 version of Table 4-6 for 1978/1983/1988.

4.2.1 Trends in the Annual Income of Self-Employed Physicians, 1978-1988

Tables 4-6 and 4-6a present 5 and 10 year trends in the annual income of physicians who are self-employed or employed by another physician, by specialty. Tables 4-7 and 4-7a are the same, except that income has been put in constant 1988 dollars. Interestingly, the 1988 income for all specialties, $161,800 (Table 4-6a or 4-7a), is very similar to the 1988 income of $160,000 for self-employed physicians reported by the AMA (Socioeconomic Characteristics of Medical Practice, 1989, Table 42). In fact, before our adjustment for item nonresponse on the HCFA survey slightly raised mean income, the two incomes were virtually identical. By specialty, the differences are larger, but this is to be expected because of the smaller sample sizes, and hence greater random fluctuation. The largest specialty

TABLE 4-6

MEAN NET INCOME OF SELF-EMPLOYED[a] PHYSICIANS IN 16 SPECIALTIES AND GROUPS OF LESS THAN 10, BY SPECIALTY, 1978, 1983, AND 1988, IN THOUSANDS OF DOLLARS

	1978			1983			1988			
Specialty	Mean	Standard Error	N	Mean	Standard Error	N	Mean	Standard Error	N	Percentage Change 1978-1988
All[b]	***$63.3***	***$0.5***	***4,229***	***$100.7***	***$1.6***	***2,305***	***$153.5***	***$2.9***	***2,341***	***142.4%****
General/Family Practice	51.2	1.1	571	75.2	2.4	519	101.5	3.5	386	98.4*
Medical specialties[b]	61.5	0.9	1405	91.9	2.1	650	138.8	4.2	698	125.5*
Internal medicine	60.7	1.5	370	84.9	2.6	298	114.6	3.9	310	88.7*
Cardiology	78.2	4.7	117	127.7	7.4	88	230.0	17.0	116	194.2*
Pediatrics	52.4	1.1	565	76.5	3.4	173	115.1	6.6	111	119.6*
Gastroenterology	71.9	3.0	99	122.5	11.8	39	179.1	9.3	113	149.2*
Allergy/Dermatology	65.6	2.4	254	103.8	7.2	52	145.6	12.3	48	122.0*
Surgical specialties[b]	73.9	0.9	1,634	124.3	3.5	772	195.6	5.8	921	164.8*
General Surgery	70.7	1.6	498	118.9	10.5	190	172.5	8.0	183	144.1*
Orthopedic surgery	87.6	3.4	118	141.9	7.6	112	284.5	28.1	112	224.8*
Ophthalmology	71.2	3.2	130	123.9	9.1	113	210.0	19.5	144	194.9*
Urology	69.9	2.6	129	113.7	3.8	132	166.7	7.6	155	138.6*
Obstetrics/gynecology	71.1	1.5	497	116.9	5.0	155	173.3	10.2	228	143.6*
Neurosurg./Otolaryngology	78.0	2.6	262	132.7	9.9	70	172.6	9.6	99	121.1*
Other specialties										
Psychiatry	49.8	1.0	515	76.4	2.5	181	123.5	8.4	191	148.1*
Anesthesiology	75.9	3.7	104	135.4	6.2	183	186.9	7.6	145	146.4*

[a]Also includes physicians employed by another physician. Excludes employees of HMOs, hospitals, and clinics.
[b]Includes only specialties shown separately.

*Statistically significantly different from zero at the 5 percent or better level.

Note: Active nonfederal patient care physicians, excluding residents. Income from medical practice after expenses but before taxes. Means are weighted to adjust for nonrandomness of the sample, nonresponse to the survey, and item nonresponse to the net income question.

Source: HCFA Physician Practice Cost and Income Surveys, 1978, 1983 and 1988.

TABLE 4-6a

MEAN NET INCOME OF SELF-EMPLOYED[a] PHYSICIANS, BY SPECIALTY, 1983 AND 1988, IN THOUSANDS OF DOLLARS

	1983			1988			Percentage Change 1983-1988
	Mean	Standard Error	N	Mean	Standard Error	N	
All	***$103.6***	***$1.3***	***3,144***	***$161.8***	***$2.6***	***3,214***	***56.2%****
General/family practice	75.7	2.4	533	102.5	3.7	410	35.4*
Medical specialties	93.7	9.9	790	145.0	3.8	891	54.7*
Internal Medicine	86.6	2.5	330	115.1	3.5	357	33.0*
Cardiology	126.8	6.6	99	229.7	16.1	126	81.2*
Pediatrics	76.5	3.3	181	112.9	6.0	128	47.5*
Gastroenterology	120.8	11.3	41	178.4	8.1	133	47.6*
Other medical specialties	102.8	4.5	139	171.0	11.5	147	66.4*
Surgical specialties	123.4	3.1	916	203.5	5.4	1,197	64.9*
General surgery	117.5	9.8	203	176.8	8.9	202	50.5*
Orthopedic surgery	143.8	7.2	119	278.3	24.0	134	93.6*
Ophthalmology	123.7	8.8	117	210.4	19.1	147	70.1*
Urology	112.6	3.7	141	167.4	7.1	166	48.6*
Obstetrics/Gynecology	116.1	5.0	199	174.6	9.6	247	50.4*
Cardio./thoracic surgery	118.5	12.9	25	310.5	21.8	138	162.0*
Other surgical specialties	129.0	7.0	112	192.6	9.4	163	49.3*
Other specialties	109.2	2.0	905	165.5	3.9	716	51.5*
Psychiatry	78.1	2.6	194	128.4	9.4	195	64.3*
Anesthesiology	135.0	5.1	234	192.8	6.3	192	42.8*
Radiology	124.0	4.0	182	189.6	7.2	148	52.9*
Pathology	117.3	3.6	147	173.3	13.2	39	47.7*
Emergency Medicine	101.4	7.0	86	146.2	11.5	74	44.1*
Other	102.4	5.5	62	153.8	9.9	68	50.2*

[a]Also includes physicians employed by another physician. Excludes employees of HMOs, hospitals, and clinics.

*Statistically significantly different from zero at the 5 percent or better level.

Note: Active nonfederal patient care physicians, excluding residents. Income from medical practice after expenses but before taxes. Means are weighted to adjust for nonrandomness of the sample, nonresponse to the survey, and item nonresponse to the net income question.

Source: HCFA Physician Practice Cost and Income Surveys, 1983 and 1988.

TABLE 4-7

MEAN REAL NET INCOME OF SELF-EMPLOYED[a] PHYSICIANS IN 16 SPECIALTIES AND GROUPS OF LESS THAN 10, BY SPECIALTY, 1978, 1983, and 1988, IN THOUSANDS OF 1988 DOLLARS

Specialty	1978 Mean	1978 Standard Error	1978 N	1983 Mean	1983 Standard Error	1983 N	1988 Mean	1988 Standard Error	1988 N	Percentage Change 1978-1988
All[b]	***$114.9***	***$1.0***	***4,229***	***$119.6***	***$1.9***	***2,305***	***$153.5***	***$2.9***	***2,341***	***33.6%****
General/Family Practice	92.8	1.9	571	89.3	2.9	519	101.5	3.5	386	9.4*
Medical specialties[b]	111.7	1.6	1,405	109.1	2.5	650	138.8	4.2	698	24.3*
Internal Medicine	110.2	2.7	370	100.8	3.1	298	114.6	3.9	310	4.0
Cardiology	141.9	8.5	117	151.6	8.8	88	230.0	17.0	116	62.1*
Pediatrics	95.1	2.0	565	90.9	4.0	173	115.1	6.6	111	21.0*
Gastroenterology	130.4	5.5	99	145.5	14.0	39	179.1	9.3	113	37.3*
Allergy/Dermatology	119.0	4.4	254	123.3	8.6	52	145.6	12.3	48	22.4*
Surgical specialties[b]	134.0	1.6	1634	147.6	4.1	772	195.6	5.8	921	45.9*
General Surgery	128.2	3.0	498	141.2	12.4	190	172.5	8.0	183	34.5*
Orthopedic surgery	158.9	6.2	118	168.6	9.0	112	284.5	28.1	112	79.0*
Ophthalmology	129.2	5.8	130	147.2	10.8	113	210.0	19.5	144	62.5*
Urology	126.8	4.8	129	135.1	4.5	132	166.7	7.6	155	31.5*
Obstetrics/gynecology	129.1	2.7	497	138.8	5.9	155	173.3	10.2	228	34.3*
Neurosurg./Otolaryngology	141.6	4.7	262	157.6	11.7	70	172.6	9.6	99	21.9*
Other specialties										
Psychiatry	90.3	1.8	515	90.7	3.0	181	123.5	8.4	191	36.7*
Anesthesiology	137.6	6.8	104	160.8	7.4	183	186.9	7.6	145	35.8*

[a]Also includes physicians employed by another physician. Excludes employees of HMOs, hospitals, and clinics.

[b]Includes only specialties shown separately.

*Statistically significantly different drom zero at the 5 percent or better level.

Note: Active nonfederal patient care physicians, excluding residents. Income from medical practice after expenses but before taxes. Means are weighted to adjust for nonrandomness of the sample, nonresponse to the survey, and item nonresponse to the net income question.

Source: HCFA Physician Practice Cost and Income Surveys, 1978, 1983 and 1988.

TABLE 4-7a

MEAN REAL NET INCOME OF SELF-EMPLOYED[a] PHYSICIANS, BY SPECIALTY, 1983 AND 1988, IN THOUSANDS OF 1988 DOLLARS

	1983			1988			Percentage Change 1983-1988
	Mean	Standard Error	N	Mean	Standard Error	N	
All	***$123.1***	***$1.5***	***3,144***	***$161.8***	***$2.6***	***3,214***	***31.5%****
General/family practice	89.9	2.8	533	102.5	3.7	410	14.0*
Medical specialties	111.3	2.3	790	145.0	3.8	891	30.3*
Internal Medicine	102.9	2.9	330	115.1	3.5	357	11.9*
Cardiology	150.6	7.9	99	229.7	16.1	126	52.5*
Pediatrics	90.9	3.9	181	112.9	6.0	128	24.2*
Gastroenterology	143.5	13.4	41	178.4	8.1	133	24.3*
Other medical specialties	122.1	5.4	139	171.0	11.5	147	40.1*
Surgical specialties	146.5	3.6	916	203.5	5.4	1,197	38.9*
General surgery	139.5	11.7	203	176.8	8.9	202	26.7*
Orthopedic surgery	170.8	8.6	119	278.3	24.0	134	63.0*
Ophthalmology	146.9	10.5	117	210.4	19.1	147	43.2*
Urology	133.8	4.4	141	167.4	7.1	166	25.1*
Obstetrics/Gynecology	137.9	6.0	199	174.6	9.6	247	26.6*
Cardio./thoracic surgery	140.8	15.3	25	310.5	21.8	138	120.6*
Other surgical specialties	153.2	8.3	112	192.6	9.4	163	25.7*
Other specialties	129.7	2.4	905	165.5	3.9	716	27.6*
Psychiatry	92.8	3.0	194	128.4	9.4	195	38.3*
Anesthesiology	160.4	6.1	234	192.8	6.3	192	20.2*
Radiology	147.3	4.7	182	189.6	7.2	148	28.7*
Pathology	139.3	4.3	147	173.3	13.2	39	24.4*
Emergency Medicine	120.5	8.4	86	146.2	11.5	74	21.3
Other	121.6	6.6	62	153.8	9.9	68	26.5*

[a]Also includes physicians employed by another physician. Excludes employees of HMOs, hospitals, and clinics.

*Statistically significantly different from zero at the 5 percent or better level.

Note: Active nonfederal patient care physicians, excluding residents. Income from medical practice after expenses but before taxes. Means are weighted to adjust for nonrandomness of the sample, nonresponse to the survey, and item nonresponse to the net income question.

Source: HCFA Physician Practice Cost and Income Surveys, 1983 and 1988.

difference is the $220,300 mean radiologist income reported by the AMA versus $189,600 tabulated from the HCFA survey. The AMA reports a much lower $113,000 mean income for employed physicians (all specialties), which explains why the mean incomes (for employed and self-employed physicians) discussed in Section 4.1 are lower than those presented in this section.

The net income of the 1978 HCFA sample of physicians grew by 142 percent over the 10 years following 1978 (Table 4-6). However, most of this income growth was eroded by inflation. On an inflation-adjusted basis, income grew by "only" 34 percent (Table 4-7). Nearly all of the real income growth in the ten year period occurred between 1983 and 1988. Real income rose by less than 5 percent between 1978 and 1983, then grew 28 percent between 1983 and 1988 (Table 4-7). These large income gains are consistent with the annual AMA trends discussed in the previous section, which show rapid income growth between 1985 and 1988. For all specialties and group sizes (Table 4-7a), the HCFA surveys show a real net income increase of 32 percent between 1983 and 1988, from $123,100 to $161,800 in 1988 dollars.

The AMA surveys measure a smaller increase in the net income of self-employed physicians. They show a 16.2 percent real increase from 1983 to 1988, from $137,660 to $160,000 (1988 dollars) (AMA, Socioeconomic Characteristics of Medical Practice, 1989 and 1984 editions). The smaller increase is almost entirely due to the higher measured income in 1983 in the AMA data compared to the HCFA data. However, the AMA-reported 1983 income is not exactly comparable to the 1988 income because the AMA did not weight its results for nonresponse bias before the 1989 edition of Socioeconomic Characteristics of Medical Practice.

The HCFA data show all specialties gaining in average real income from 1978 to 1988. Nevertheless, the surgical specialties show larger, and steadier, income growth over the 10-year period than do other specialties. The real income of the 1978 HCFA sample of surgical specialties grew by 46 percent over 10 years versus 24 percent for the medical specialties, and only 9 percent for general/family practice (Table 4-7). Moreover, although surgeons' real income growth accelerated from 1983 to 1988 compared to from 1978 to 1983, they showed respectable gains in the earlier period.

Conversely, the real income of medical specialists and general/family practitioners actually fell slightly from 1978 to 1983 before rebounding strongly from 1983 to 1988*.

Among detailed specialties, the largest percentage gainers in real income over 10 years were cardiologists (62%), orthopedic surgeons (79%), and ophthmalogists (63%). Over 5 years (Table 4-7a), the same specialties stand out, in addition to cardiovascular/thoracic surgeons. However, the 5-year percentage gain for the latter specialty should be treated with caution because the sample size was only 25 physicians in 1983; Cardiovascular/thoracic surgeons' 1983 mean income may be understated.

Internists fared most poorly of all specialties over 5 and 10 year periods, even worse than general/family practitioners. Indeed, their 4 percent 10-year real income gain is not statistically different from zero (Table 4-7). General/family practitioners had the second most slowly growing net incomes. In real terms, they gained 9 percent over 10 years, and 14 percent over 5 years. Their gain from 1983 to 1988 was only half that of all self-employed physicians (Table 4-7a).

Tables 4-8 and 4-8a present trends in real mean net income by age, sex, race, FMG status, geographic location, and practice size. Over 10 years, the growth in female physicians' mean real income outstripped that of male physicians, 57 percent to 35 percent (Table 4-8). Over 5 years, however, the relative rates of growth are reversed, with males' real incomes rising 33 percent compared to 24 percent for females' real incomes (Table 4-8a). Hence, all of females' relative gain over the 10 year period occurred between 1978 and 1983; they actually lost ground relative to males between 1983 and 1988. Much of this reversal may be accounted for by the financial ascendancy of surgeons between 1983 and 1988, a group in which women are underrepresented.

There is no clear pattern in income growth rates by age. Over 10 years, average income among the oldest physicians grew the fastest, but the sampling variability of estimated mean income for this group is large. Over 5 years,

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*The decline from 1978 to 1983 may not be statistically significant.

TABLE 4-8

MEAN REAL NET INCOME OF SELF-EMPLOYED[a] PHYSICIANS IN 16 SPECIALTIES AND GROUPS OF LESS THAN 10, BY AGE, SEX, FMG STATUS, GEOGRAPHIC LOCATION, AND GROUPSIZE, 1978, 1983, AND 1988, IN THOUSANDS OF 1988 DOLLARS

	1978			1983			1988			
	Mean	Standard Error	N	Mean	Standard Error	N	Mean	Standard Error	N	Percentage Change 1978-1988
All	*$114.9*	*$1.0*	*4,229*	*$119.6*	*$1.9*	*2,305*	*$153.5*	*$2.9*	*2,341*	*33.6%**
Age										
< 36 years	103.2	2.4	444	109.0	3.3	399	138.2	5.6	326	33.9*
36-45 years	130.2	1.7	1,382	129.3	4.2	734	172.1	5.8	867	32.2*
46-55 years	127.1	1.8	1,231	128.8	3.4	604	164.5	4.6	606	29.5*
56-65 years	101.6	1.9	814	113.0	4.0	400	130.9	4.6	405	28.9*
> 65 years	70.4	2.2	358	86.6	4.1	168	102.4	15.0	137	45.5*
Sex										
Male	116.7	1.0	4,032	121.6	1.9	2,146	157.7	3.1	2,161	35.1*
Female	70.3	2.6	197	92.2	8.1	159	110.6	6.0	180	57.4*
Medical School										
Domestic	117.2	1.0	3,548	120.4	1.9	1,767	156.2	3.1	2,128	33.3*
Foreign	102.9	2.2	681	117.2	4.9	538	127.5	5.7	213	24.0*
Urban/Rural										
Metropolitan	115.9	1.1	3,305	121.6	2.2	1,843	156.6	3.5	1,709	35.2*
Nonmetropolitan	111.0	1.8	924	111.4	3.6	462	137.5	4.8	632	23.8*
Region										
Northeast	99.1	1.7	1,055	111.8	2.9	524	153.2	8.5	494	54.5*
Midwest	118.0	1.9	988	117.5	3.1	481	151.7	5.3	482	28.6*
South	124.6	1.9	1,201	126.2	4.0	782	155.0	3.9	867	24.4*
West	115.6	1.9	985	119.7	4.0	518	153.2	6.3	498	32.6*
Groupsize										
1	103.3	1.1	2,640	108.9	2.4	1,302	135.1	2.8	1,340	30.8*
2-4	132.1	1.8	1,271	130.7	3.3	756	177.1	7.0	745	34.1*
5-9	146.2	3.6	318	143.8	5.3	247	180.6	7.0	256	23.5*

[a]Also includes physicians employed by another physician. Excludes employees of HMOs, hospitals, and clinics.

*Statistically significantly different from zero at the 5 percent or better level.

Note: Active nonfederal patient care physicians, excluding residents. Income from medical practice after expenses but before taxes. Means are weighted to adjust for nonrandomness of the sample, nonresponse to the survey, and item nonresponse to the net income question. Specialties included in the table are listed in Table 3-1.

Source: HCFA Physician Practice Cost and Income Surveys, 1978, 1983 and 1988.

TABLE 4-8a

MEAN REAL NET INCOME OF SELF-EMPLOYED[a] PHYSICIANS, BY AGE, SEX, RACE, FMG STATUS, GEOGRAPHIC LOCATION, AND GROUPSIZE, 1983 AND 1988, IN THOUSANDS OF 1988 DOLLARS

	1983			1988			
	Mean	Standard Error	N	Mean	Standard Error	N	Percentage Change 1983-1988
All	***$123.1***	***$1.5***	***3,144***	***$161.8***	***$2.6***	***3,214***	***31.5%****
Age							
< 36 years	111.3	2.8	580	139.9	4.6	454	25.7*
36-45 years	132.2	3.1	1,070	178.2	5.1	1,225	34.8*
46-55 years	131.7	2.7	805	171.7	4.0	842	30.4*
56-65 years	117.5	3.6	495	146.3	5.0	531	24.5*
> 65 years	88.6	3.8	194	108.2	13.0	162	22.1
Sex							
Male	125.3	1.5	2,923	166.3	2.7	2,974	32.7*
Female	92.6	6.1	221	114.6	5.1	240	23.8*
Race							
White	125.0	1.7	2,609	166.7	3.0	2,642	33.3*
Hispanic	119.6	10.1	77	137.0	10.3	92	14.5
Black	89.5	5.2	68	116.7	10.8	82	30.5*
Asian	111.8	3.0	334	146.7	5.3	356	31.2*
Medical School							
Domestic	124.5	1.6	2,466	164.4	2.8	2,940	32.1*
Foreign	118.0	4.0	678	134.1	5.5	274	13.6*
Urban/Rural							
Metropolitan	125.0	1.7	2,544	165.2	3.1	2,418	32.2*
Nonmetropolitan	114.5	2.9	600	142.6	4.2	796	24.6*
Region							
Northeast	114.5	2.5	685	162.8	7.5	650	42.2*
Midwest	125.0	2.8	694	153.8	5.0	713	23.1*
South	128.0	3.1	1,060	166.9	3.8	1,135	30.4*
West	122.6	3.2	705	160.7	5.2	716	31.1*
Groupsize							
1	109.1	2.2	1,476	140.1	2.8	1,552	28.5*
2-4	133.8	2.7	1,017	182.7	6.3	925	36.6*
5-9	140.7	3.8	398	180.9	7.7	379	28.6*
10+	142.7	4.5	249	179.7	6.4	357	26.0*

[a]Also includes physicians employed by another physician. Excludes employees of HMOs, hospitals, and clinics.

*Statistically significantly different from zero at the 5 percent or better level.

Note: Active nonfederal patient care physicians, excluding residents. Income from medical practice after expenses but before taxes. Means are weighted to adjust for nonrandomness of the sample, nonresponse to the survey, and item nonresponse to the net income question.

Source: HCFA Physician Practice Cost and Income Surveys, 1983 and 1988.

physicians between the ages of 35 and 56 seem to have experienced greater income growth than either younger or older physicians. By race, Hispanic physicians experienced slower income growth between 1983 and 1988 than physicians of other races. Graduates of foreign medical schools fared less well than domestic graduates, especially from 1983 to 1988. The average incomes of physicians in small groups of 2-4 increased most rapidly over 5 and 10 year periods, with physicians in larger groups perhaps faring worse than solos.

Metropolitan physicians experienced faster income growth over 5 and 10 years than nonmetropolitan physicians. Over 10 years (Table 4-8), real income grew 35 percent, on average, for metropolitan physicians versus 24 percent for nonmetropolitan physicians. From 1983 to 1988, metropolitan physicians gained 32 percent in real income, and nonmetropolitan physicians 25 percent. Physicians in the Northeast did better financially over 5 and 10 year periods than physicians in other regions of the country. From 1978 to 1988 (Table 4-8), they gained 55 percent in real income, doubling the gains of Midwestern and Southern physicians. By 1988 physicians in the Northeast had achieved parity with physicians in other regions, overcoming their disadvantaged position in 1978.

4.2.2 Trends in the Real Hourly Net Income of Self-Employed Physicians, 1978-1988

Physicians may earn more either because they work longer hours, or because their average return to an hour worked rises. This section examines trends in physician hourly income. Although average hourly income is a useful indicator of average return to physician work effort, it does not necessarily accurately measure a physician's financial incentive to supply more services at the margin. There are two reasons that the average return may not equal the marginal return to a hour worked. First, fixed practice costs such as office and equipment rental can be spread over more services as work effort increases, raising the marginal return to work effort. Second, to attract more patients, the self-employed physician may have to lower his fees,

reducing the marginal return to work effort. Since these two effects are offsetting, the relation between average and marginal hourly income is uncertain, but there is no reason to expect the two to be identical. The difference between the average and marginal return to work effort should be kept in mind when interpreting hourly incomes.

Tables 4-9 and 4-9a show trends in real mean net hourly income, by specialty, over 5 and 10 year periods. Sample sizes are considerably smaller than for annual incomes because hourly incomes were calculated only for physicians for whom meaningful annual hours worked estimates could be made (see Section 3.2.2). The 5 and 10 year growth rates of average hourly income are lower than the growth rates of annual income discussed above, implying that some of physician income gains have resulted from greater work effort. From 1983 to 1988 (Table 4-9a), mean real hourly net income for all specialties grew by 23 percent, compared to a 32 percent growth in real annual income (Table 4-7a). From 1978 to 1988 (Table 4-9), real hourly income grew 29 percent compared to a 34 percent growth in real annual income (Table 4-7). However, in spite of some increase in work effort, most of physician income gains over the 5 and 10 year periods were due to higher hourly compensation, not greater work effort.

The results by specialty are similar to the all-specialty results. Growth rates in hourly income are consistently below those in annual income, by varying amounts. Orthopedic surgeons, anesthesiologists (only for 1983-1988), and general practitioners (only for 1978-1988) are exceptions where hourly income growth has exceeded annual income growth, although these differences may not be statistically significant.

Specialties that showed higher (lower) growth rates in annual income also show larger (smaller) increases in hourly income. From 1978 to 1988, the average real hourly income of internists actually fell by 1.8 percent, although the change was not statistically different from zero. Orthopedic and cardiovascular/thoracic surgeons stand out for their enormous gains in average real hourly income, but small sample sizes mean that the measured increases must be interpreted with caution. In general, most of annual income gains were due to higher hourly compensation, not greater work effort.

TABLE 4-9

MEAN REAL HOURLY NET INCOME OF SELF-EMPLOYED[a] PHYSICIANS IN 16 SPECIALTIES AND GROUPS OF LESS THAN 10, BY SPECIALTY, 1978, 1983, AND 1988, IN 1988 DOLLARS

	1978			1983			1988			
Specialty	Mean	Standard Error	N	Mean	Standard Error	N	Mean	Standard Error	N	Percentage Change 1978-1988
All[b]	***$45.8***	***$0.6***	***2,333***	***$48.2***	***$1.4***	***1,017***	***$58.9***	***$1.4***	***1,863***	***28.7%****
General/Family Practice	35.3	1.2	342	37.8	2.6	239	39.6	1.7	302	12.2*
Medical specialties[b]	45.0	1.0	780	41.3	1.3	294	50.5	1.6	562	12.2*
Internal Medicine	41.8	1.5	204	38.7	1.7	143	41.1	1.6	249	-1.8
Cardiology	54.0	4.6	65	52.0	4.8	33	74.9	6.1	96	38.7*
Pediatrics	37.4	1.0	300	34.8	1.7	76	43.8	3.0	86	17.2*
Gastroenterology	50.7	3.7	54	51.8	8.4	16	60.4	3.3	90	19.1
Allergy/Dermatology	62.3	3.0	157	54.5	5.5	26	63.8	5.4	41	2.4
Surgical specialties[b]	53.5	1.0	880	61.6	3.6	327	75.6	2.9	732	41.4*
General Surgery	49.8	1.8	264	58.1	11.9	76	63.5	3.8	148	27.5*
Orthopedic surgery	59.7	4.0	67	68.4	5.9	51	119.7	17.3	87	100.6*
Ophthalmology	58.8	3.2	75	71.8	11.4	56	87.5	7.1	120	48.9*
Urology	48.7	2.9	69	50.6	2.6	55	59.6	3.5	120	22.4*
Obstetrics/gynecology	51.3	1.6	269	51.8	2.6	60	61.9	4.7	168	20.6*
Neurosurg./Otolaryngology	56.2	2.6	136	68.4	6.0	29	64.5	3.8	89	14.8
Other specialties										
Psychiatry	39.2	1.1	271	40.7	3.0	83	52.7	4.0	151	34.3*
Anesthesiology	57.4	4.4	60	60.2	2.8	74	73.4	3.7	116	27.8*

[a]Also includes physicians employed by another physician. Excludes employees of HMOs, hospitals, and clinics.
[b]Includes only specialties shown separately.

*Statistically significantly different from zero at the 5 percent or better level.

Note: Active nonfederal patient care physicians, excluding residents. Income from medical practice after expenses but before taxes. Means are weighted to adjust for nonrandomness of the sample, nonresponse to the survey, and item nonresponse to the net income question.

Source: HCFA Physician Practice Cost and Income Surveys, 1978, 1983 and 1988.

TABLE 4-9a

MEAN REAL HOURLY NET INCOME OF SELF-EMPLOYED[a] PHYSICIANS, BY SPECIALTY, 1983 AND 1988, IN 1988 DOLLARS

	1983			1988			
	Mean	Standard Error	N	Mean	Standard Error	N	Percentage Change 1983-1988
All	***$50.8***	***$1.1***	***1,436***	***$62.5***	***$1.2***	***2,557***	***23.0%****
General/family practice	37.6	2.5	245	40.4	2.0	320	7.3
Medical specialties	42.6	1.2	362	52.4	1.4	709	23.1*
Internal Medicine	39.7	1.6	163	41.1	1.4	291	3.5
Cardiology	51.9	4.2	39	73.9	5.7	105	42.4*
Pediatrics	35.0	1.6	80	43.1	2.9	94	23.2*
Gastroenterology	50.4	8.0	17	60.7	3.0	101	20.4
Other medical specialties	51.3	3.4	63	65.4	4.3	118	27.0*
Surgical specialties	61.5	3.1	391	78.0	2.5	961	26.8*
General surgery	58.3	10.9	83	65.4	4.0	164	12.2
Orthopedic surgery	68.6	5.6	54	116.6	14.7	103	70.0*
Ophthalmology	71.5	11.0	58	87.4	7.0	121	22.3
Urology	50.5	2.6	58	60.3	3.3	131	19.6*
Obstetrics/Gynecology	51.0	2.2	81	63.5	4.3	185	24.4*
Cardio./thoracic surgery	48.5	7.8	9	105.0	7.8	112	116.8*
Other surgical specialties	72.7	5.3	48	71.5	4.0	145	-1.6
Other specialties	56.9	1.6	438	68.7	1.9	567	20.8*
Psychiatry	41.4	2.8	91	54.6	4.4	153	31.9*
Anesthesiology	61.0	2.4	103	74.7	3.0	155	22.4*
Radiology	67.1	3.2	99	81.3	4.0	114	21.2*
Pathology	61.5	2.7	86	70.6	6.4	33	14.9
Emergency Medicine	61.9	12.4	34	64.4	5.2	56	4.0
Other	50.8	4.9	25	63.7	5.1	56	25.6

[a]Also includes physicians employed by another physician. Excludes employees of HMOs, hospitals, and clinics.

*Statistically significantly different from zero at the 5 percent or better level.

Note: Active nonfederal patient care physicians, excluding residents. Income from medical practice after expenses but before taxes. Means are weighted to adjust for nonrandomness of the sample, nonresponse to the survey, and item nonresponse to the net income question.

Source: HCFA Physician Practice Cost and Income Surveys, 1983 and 1988.

Tables 4-10 and 4-10a show trends in real mean hourly income by sex, age, race, FMG status, geographic location, and practice size. Comparing these tables to the analogous annual income tables (Tables 4-8 and 4-8a) indicates that greater work effort accounted for a much higher proportion of the income gains of females than males. From 1978 to 1988, males' annual income grew by 35 percent and their hourly income by 30 percent. Conversely, females' annual income was 57 percent higher, but their hourly income was only 38 percent greater. From 1983 to 1988 (Table 4-8a), males' annual incomes rose by 33 percent and hourly incomes by 25 percent. However, females' annual incomes rose by 24 percent, but their hourly incomes increased by a statistically insignificant 7 percent. Over 10 years, the hourly incomes of males and females rose by similar percentages, but over 5 years the hourly income of males increased at a much more rapid rate. This difference is probably largely accounted for by the underrepresentation of females in the surgical specialties.

From 1978 to 1988, rates of change in hourly and annual incomes are similar by age, FMG status, and practice size, with the percentage change in hourly income generally slightly lower. From 1983 to 1988, more divergences appear, with rates of hourly income growth higher relative to annual income increases than over the 10 year period. Young physicians (under age 36) suffered relatively slow growth in real hourly income from 1983 to 1988, a statistically insignificant 11 percent.

Hourly incomes of metropolitan physicians grew faster than hourly incomes of nonmetropolitan physicians, as was true of their annual incomes. Northeastern physicians enjoyed very rapid growth in hourly incomes, especially from 1983 to 1988. Over that 5 years, their real average hourly income rose by 45 percent, double the national average increase of 23 percent. All of the increase from 1983 to 1988 in their annual incomes was accounted for by higher hourly compensation. In contrast to Northeastern physicians, Western physicians experienced only a statistically insignificant 10 percent rise in real hourly income from 1983 to 1988, in spite of 31 percent growth in real annual income. Apparently, most of the increase in their incomes over the 5 year period was due to greater work effort.

TABLE 4-10

MEAN REAL HOURLY NET INCOME OF SELF-EMPLOYED[a] PHYSICIANS, IN 16 SPECIALTIES AND GROUPS OF LESS THAN 10, BY AGE, SEX, FMG STATUS, GEOGRAPHIC LOCATION, AND GROUPSIZE, 1978, 1983, AND 1988, IN 1988 DOLLARS

	1978			1983			1988			Percentage Change 1978-1988
	Mean	Standard Error	N	Mean	Standard Error	N	Mean	Standard Error	N	
All	***$45.8***	***$0.6***	***2,333***	***$48.2***	***$1.4***	***1,017***	***$58.9***	***$1.4***	***1,863***	***28.7%****
Age										
< 36 years	37.9	1.4	203	40.9	2.1	127	49.3	2.5	248	29.9*
36-45 years	49.7	1.0	742	52.7	3.4	327	64.3	2.9	676	29.3*
46-55 years	50.4	1.1	728	48.7	1.8	291	63.1	2.2	490	25.2*
56-65 years	41.9	1.2	475	48.5	3.7	185	53.5	2.0	330	27.6*
> 65 years	33.5	1.7	185	40.3	3.0	87	49.7	6.5	119	48.4*
Sex										
Male	46.2	0.6	2,242	48.6	1.5	950	60.1	1.4	1,727	30.1*
Female	32.7	2.0	91	43.4	4.4	67	45.2	2.8	136	38.3*
Medical School										
Domestic	46.5	0.6	1969	49.4	1.4	789	59.6	1.5	1700	28.2*
Foreign	41.6	1.2	364	44.0	4.1	228	51.4	2.9	163	23.4*
Urban/Rural										
Metropolitan	47.2	0.7	1,805	49.5	1.7	804	60.7	1.6	1,371	28.6*
Nonmetropolitan	40.5	0.9	528	43.4	2.6	213	49.3	2.3	492	21.8*
Region										
Northeast	40.6	1.0	565	41.9	1.7	242	61.1	4.4	412	50.6*
Midwest	45.4	1.2	592	47.0	1.8	223	57.5	2.6	377	26.6*
South	48.2	1.1	659	49.3	2.9	342	58.3	1.7	682	21.0*
West	48.8	1.2	517	54.7	4.3	210	58.6	2.2	392	20.1*
Groupsize										
1	42.0	0.7	1,427	44.7	2.1	546	51.8	1.2	1,079	23.4*
2-4	50.0	1.1	727	51.9	2.4	336	67.2	3.4	576	34.3*
5-9	59.7	2.2	179	53.9	2.4	135	72.1	3.7	208	20.8*

[a]Also includes physicians employed by another physician. Excludes employees of HMOs, hospitals, and clinics.

*Statistically significantly different from zero at the 5 percent or better level.

Note: Active nonfederal patient care physicians, excluding residents. Income from medical practice after expenses but before taxes. Means are weighted to adjust for nonrandomness of the sample, nonresponse to the survey, and item nonresponse to the net income question. Specialties included in this table are listed in Table 3-1.

Source: HCFA Physician Practice Cost and Income Surveys, 1978, 1983 and 1988.

TABLE 4-10a

MEAN REAL HOURLY NET INCOME OF SELF-EMPLOYED[a] PHYSICIANS, BY AGE, SEX, RACE, FMG STATUS, GEOGRAPHIC LOCATION, AND GROUPSIZE, 1983 AND 1988, IN 1988 DOLLARS

	1983			1988			
	Mean	Standard Error	N	Mean	Standard Error	N	Percentage Change 1983-1988
All	***$50.8***	***$1.1***	***1,436***	***$62.5***	***$1.2***	***2,557***	***23.0%****
Age							
< 36 years	45.6	2.3	203	50.7	2.1	344	11.1
36-45 years	54.6	2.4	490	66.6	2.3	956	22.1*
46-55 years	52.0	1.7	407	66.7	1.9	676	28.3*
56-65 years	49.3	3.0	235	60.6	2.2	441	22.8*
> 65 years	42.2	2.8	101	52.7	5.7	140	25.0
Sex							
Male	51.3	1.2	1,341	63.9	1.2	2,374	24.6*
Female	44.6	3.4	95	47.9	2.4	183	7.4
Race							
White	52.4	1.3	1,206	64.8	1.4	2,097	23.7*
Hispanic	40.7	3.9	38	55.4	4.3	82	36.3*
Black	34.8	2.0	28	36.2	2.5	68	4.2
Asian	44.4	2.0	143	56.3	2.4	289	26.7*
Medical School							
Domestic	52.0	1.1	1,138	63.2	1.2	2,345	21.6*
Foreign	46.2	3.3	298	54.6	2.7	212	18.1*
Urban/Rural							
Metropolitan	52.1	1.3	1,155	64.2	1.4	1,932	23.1*
Nonmetropolitan	45.2	2.1	281	53.1	2.0	625	17.5*
Region							
Northeast	44.9	1.4	335	64.9	3.7	543	44.6*
Midwest	51.7	2.0	332	59.5	2.3	557	15.2*
South	51.0	2.2	477	63.1	1.6	900	23.6*
West	56.3	3.2	292	62.1	1.9	557	10.4
Groupsize							
1	46.1	2.0	626	53.6	1.2	1,258	16.3*
2-4	54.5	1.9	475	70.0	3.0	723	28.3*
5-9	55.5	2.0	207	72.5	3.4	296	30.6*
10+	55.3	2.2	125	71.8	2.9	279	29.8*

[a]Also includes physicians employed by another physician. Excludes employees of HMOs, hospitals, and clinics.

*Statistically significantly different from zero at the 5 percent or better level.

Note: Active nonfederal patient care physicians, excluding residents. Income from medical practice after expenses but before taxes. Means are weighted to adjust for nonrandomness of the sample, nonresponse to the survey, and item nonresponse to the net income question.

Source: HCFA Physician Practice Cost and Income Surveys, 1983 and 1988.

4.3 Comparison of Physician Income Trends to Other Occupations Using Current Population Survey Data, 1982-89

The earlier sections of this chapter have shown that physicians' incomes have increased rapidly in the 1980s, both in absolute dollar terms and relative to inflation. But how have physicians fared financially relative to other professions? Are physicians' income gains unique, or one instance of higher incomes for most professionals? Our review of the determinants of physician incomes in Chapter 2 suggests that in the long run, physicians' incomes will be linked to those of comparable occupations. In this chapter, we compare changes in physician incomes to those of reference occupations.

Our source for the income comparisons is the Current Population Survey (CPS), conducted by the U.S. Bureau of the Census. The CPS is an annual survey of the civilian, noninstitutionalized United States population that collects demographic, income, and other information. Income tabulations are reported in the Census Bureau's series Current Population Reports. A consistent income series is available from 1982 through 1989, which is what we report.

Table 4-11 shows income comparisons by education and occupation from the CPS. Incomes are in 1988 dollars. We limit the comparisons to males because physicians are overwhelmingly male and overall male and female income trends have diverged in the 1980s. Also, to control for hours worked, we limit the comparisons to full-time, year-round workers.

CPS earnings are subject to sampling error. Relative standard errors depend on the size of the particular occupation, but are in the range of 1 to 5 percent. For example, the 1987 earnings value for lawyers and judges of $64,021 is based on a sample of 539 (self-reported) lawyers and judges, and has a standard error of $2,563 (1988 dollars), or 4 percent. Hence, small differences (roughly, less than 5 percent) in rates of income change should not be considered significant; also, rates of change may be sensitive to anomalous values in the beginning and ending years.

TABLE 4-11

MEAN REAL ANNUAL EARNINGS OF MALE YEAR-ROUND FULL-TIME WORKERS, BY EDUCATION AND OCCUPATION, 1982-1989 (in thousands of 1988 dollars)

	1982	1983	1984	1985	1986	1987	1988	1989	Absolute Change 1982-89	Percentage Change 1982-89
All Occupations[a]	$28.9	$29.2	$29.5	$30.1	$31.1	$31.1	$31.1	$31.6	$2.7	9%
College Graduates[b]	36.2	36.8	37.7	38.9	40.5	39.7	39.2	40.5	4.3	12
Post-College Educated[c]	44.3	45.0	45.3	48.9	50.0	49.9	50.1	52.7	8.4	19
Accountants and Auditors[a]	35.4	35.9	38.8	38.4	37.8	41.7	40.6	42.2	6.8	19
Professional Specialty Occupations[a]	39.5	39.6	39.9	41.4	44.0	43.2	42.5	44.6	5.1	13
Health Diagnosing Occupations[a,d]	68.7	68.2	71.2	71.4	80.0	80.9	80.0	84.8	16.1	23
Engineers[a]	42.3	41.8	41.8	41.9	45.2	42.9	44.2	42.5	0.2	0
Natural Scientists and Mathematicians[a]	39.0	39.3	39.8	41.9	40.7	41.2	39.3	42.4	3.4	9
Postsecondary Teachers[a]	34.5	37.1	37.2	40.9	42.6	42.0	44.6	44.9	10.4	30
Lawyers and Judges[a]	54.9	55.8	54.9	60.9	68.4	64.0	66.2	69.7	14.8	27

[a]Civilian workers 15 years and over.

[b]18 years old and over, with 4 years of college.

[c]18 years old and over, with 5 or more years of college.

[d]Includes physicians (68%), dentists (18%), podiatrists, optometrists, veterinarians.

Notes: Real earnings are nominal earnings adjusted by the Consumer Price Index. For 1988 and 1989, the Census Bureau published data for persons with 4 and 5 years of college, 25 (rather than 18) years old and over. We adjusted for this discontinuity by obtaining 1987 data for persons 25 years old and over, and assuming that the rate of income growth among the two age groups was the same from 1987 to 1989. Earnings values are calculated from a sample of the population and thus are subject to sampling error.

Source: U.S. Bureau of the Census, Current Population Reports, Series P-60, 1982-89. U.S. Bureau of Labor Statistics, Consumer Price Index for all Urban Consumers.

Unfortunately, Census does not break out physicians as a separate occupational category. However, according to the 1980 decennial Census, physicians comprise about 68 percent of the category "health diagnosing occupations". Dentists are another 18 percent of this category; podiatrists, optometrists, and veterinarians are also included. Income levels for health diagnosing occupations in any year are well below those reported for physicians by the AMA or the HCFA surveys. This discrepancy is due to the inclusion of lower-earning nonphysicians in the CPS category, to the inclusion of non-patient-care physicians in the CPS sample, and to the tendency of incomes to be lower when occupation is self-reported, as on the CPS. In spite of these limitations, the CPS category appears to provide a reasonable basis for comparison of physician income changes to those of other occupations. CPS data indicates that the real income of health diagnosing occupations rose by 16.4 percent between 1982 and 1988. This increase is consistent with the 20.8 percent real income growth reported by the AMA (Table 4-1) over the same period.

From 1982 to 1989, health diagnosing occupations' incomes rose at a faster rate than the broader groups that we compare them to. Their 23 percent real income growth exceeded the 9 to 13 percent growth of all occupations, college graduates, and professional specialty occupations, and may have been statistically significantly greater than the 19 percent growth of the post-college educated. On the other hand, some specific occupations--postsecondary teachers (e.g., college professors), lawyers and judges, and accountants and auditors--achieved about the same rate of income growth as health diagnosing occupations. Other specific occupations--engineers and natural scientists and mathematicians--fared much worse from 1982 to 1989.

Health diagnosing occupations were able to achieve high rates of growth in income even though they were starting from a much higher base than any other occupational group. Their <u>absolute</u> gain in income from 1982 to 1989--about $32,900, or $16,100 in constant 1988 dollars--was larger than that of any other group (the difference from lawyers and judges is probably not statistically significant). Hence, their superiority in income over other

professions increased, even if their rate of income growth was the same or smaller. For example, postsecondary teachers achieved a higher rate of income growth (the difference may not be statistically significant), but the income gap between them and health diagnosing occupations widened from $34.2 thousand in 1982 to $39.9 thousand (1988 dollars) in 1989.

In short, the CPS data confirms that physicians did quite well financially from 1982 to 1989 compared to the college educated, and to professionals as a group. However, the 1980s income growth of physicians was not totally unique. Several other comparable professional occupations and the highly (post-college) educated did as well in terms of percentage rate of increase. Nevertheless, health diagnosing occupations' absolute income gains outstripped those of the comparison groups, widening their already large income advantage.

5.0 REASONS FOR PHYSICIAN INCOME GROWTH IN THE 1980s

In Chapter 4 we documented the rapid growth of physician income between 1983 and 1988. This chapter explores the reasons for that growth. Given physicians' central role in providing health services, almost any change in the health sector could impact their incomes. Therefore, an analysis of every factor behind growing physician income is impractical. In this chapter, we concentrate on a few key trends that may be important in explaining physician income growth. The analysis is necessarily somewhat speculative at points because of the complexity of the situation and limitations in available data.

We first consider changes in the supply of physician services. In Section 5.1, we document a slowing rate of growth in the supply of physicians that may have contributed to recent income gains. In Section 5.2, we decompose income growth into rates of change in the quantity of services provided per physician and the price/unit cost margin (profit per service). This section provides some basic information on the components of income growth. Section 5.3 turns to changes in the characteristics of the physician population such as specialty, age, sex, and FMG status. Since physician income differs along these dimensions, changes in the proportions of physicians in these categories could account for some of the income trends.

The remainder of the chapter considers changes in the demand for physician services. More widespread insurance coverage for physician services may have been an important underlying factor increasing demand. Trends in out-of-pocket payments for physician services are analyzed in Section 5.4. Section 5.5 reviews the effects of technology diffusion and the marked shift to the outpatient setting in the 1980s on physician income. Section 5.6 provides a summary and conclusions.

5.1 A Slowing Rate of Growth in the Physician Supply

The rapid physician income gains in the 1980s are especially surprising because the physician to population ratio has significantly increased. In

1980, there were 160 nonfederal patient-care physicians (including residents) per 100,000 civilian population, which rose to 196 per 100,000 population in 1988, an increase of 23 percent (American Medical Association, Physician Characteristics and Distribution in the U.S. and Statistical Abstract of the U.S., both annual). According to standard theory, other things equal, an increasing supply of physicians should depress physician earnings. However, given a rate of increase in demand for physician services, a rate which has historically exceeded population growth, a slower rate of growth in the physician supply could account for some of the physician income gains. In fact, the average annual compound rate of increase in the ratio of physicians to population did decline from 3.2 percent between 1978 and 1983 to 2.4 percent between 1983 and 1988.

The following identity provides a useful means of examining the effects of a slowing rate of increase in the physician supply on income:

$$NI = AI/N, \tag{5-1}$$

where:

NI = per physician net income,
AI = aggregate physician net income, and
N = the number of physicians.

When equation 5-1 is converted into rates of change, it becomes:

$$\dot{NI} = \dot{AI} - \dot{N}, \tag{5-2}$$

where a dot above a variable represents the logarithmic, or percentage, rate of change. Equation 5-2 decomposes the rate of change in individual physician net income into two components: the rate of change in aggregate physician net income, and the rate of change in the number of physicians.

Reasonably consistent data to implement the decomposition given by equation 5-2 are available from 1978 to 1986. We will compare the two components of the change in individual income for 1978 to 1982 versus 1982 to

1986. In its Socioeconomic Characteristics of Medical Practice, 1988 edition, the AMA reports the mean net income of active, non-federal, patient-care physicians, excluding residents, for 1978, 1982, and 1986.* These incomes are adjusted by the Consumer Price Index to convert them into real terms. The average annual compound rate of growth in real net income rose from 0.6 percent between 1978 and 1982 to 1.8 percent between 1982 and 1986. The numbers of non-federal, patient-care physicians, excluding residents, for 1978, 1982, and 1986 are available from the AMA's Physician Distribution and Characteristics in the U.S. The rate of growth in the physician supply was 4.9 percent annually between 1978 and 1982 falling to 2.9 percent annually between 1982 and 1986. The rate of growth of aggregate physician income is the sum of the rates of growth of per physician income and of the number of physicians.

Using equation 5-2, the relationships among these quantities can be summarized as follows:**

	$\dot{NI}$	=	$\dot{AI}$	-	$\dot{N}$
1978-82	0.6%		5.4%		4.9%
1982-86	1.8%		4.7%		2.9%

This table indicates that the increased rate of growth of physician income between 1982 and 1986, as opposed to between 1978 and 1982, was entirely due to the slower growth in physician supply. The rate of increase of aggregate physician income fell in the latter period, but the 41 percent reduction in the rate of growth of the physician supply was more than sufficient to imply a higher rate of increase in individual physician income.

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*Unfortunately, the AMA's Periodic Survey of Physicians, which gathered data before 1981, did not include hospital-based physicians, whereas the Socioecomic Monitoring System, used after 1981, does include hospital-based physicians. This somewhat limits the comparability of the 1978 income data with the 1982 and 1986 numbers, but office-based physicians, which comprise over 90 percent of nonfederal patient-care physicians, excluding residents, are consistently included in the sample.

**The numbers for 1978-82 do not exactly sum because of rounding.

Income changes by specialty can also be related to changes in the rate of growth of supply. Surgeons have fared better financially than other physicians in the 1980s. The rate of growth of their supply fell even more precipitously than that of all physicians from 1978-1982 to 1982-1986, by 52 percent compared to 41 percent.* It has also been claimed that the number of actively-practicing obstetricians has fallen, at least in some areas, because of malpractice liability or other reasons, and that the higher volumes of the remaining doctors may be one factor behind their strong recent income growth (Medical Economics, September 3, 1990, p. 90).**

Clearly, however, factors other than the rate of growth in physician supply, or the change in the rate of growth, are important in explaining the pattern of income growth. For example, the rate of growth in the supply of general and family practitioners has been low and falling (2.7 percent annually 1978-1982 and 1.6 percent annually 1982-1986), but the incomes of these doctors have lagged.

5.2 Growth in Services Provided and Profit per Service

This section decomposes growth in average physician income into two basic components, growth in quantity of services provided and in profit per service. First, an algebraic expression for the decomposition is developed, then aggregate data on the revenues, expenses, prices, and supply of office based physicians is used to estimate the relationship.

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*The average annual compound rate of growth of nonfederal, patient-care surgical specialists excluding residents was 4.2 percent from 1978 to 1982, and 2.0 percent from 1982 to 1986.

**However, currently available AMA data through 1986 does not support this hypothesis, at least at a national level. The number of active, nonfederal, patient-care, non-resident specialists in obstetrics/gynecology rose from 18,536 in 1978 to 22,594 in 1982 and 24,944 in 1986. Moreover, the number of births per specialist fell from 175 in 1978 to 160 in 1982 and 148 in 1986. (Births are taken from the American Hospital Association's Hospital Statistics.) On the other hand, the rate of growth of obstetrics/gynecologist specialists has been halved, from 5.0 percent 1978 to 1982 to 2.5 percent 1982 to 1986. Further, more recent data for the latter 1980s might show a different trend in the number of births per active specialist.

Average physician net income from practice equals aggregate practice revenues minus aggregate practice costs, divided by the number of physicians:

$$NI = (AR - AC)/N, \tag{5-3}$$

where:

NI = average physician net income,

AR = aggregate practice revenue,

AC = aggregate practice costs, and

N = the number of physicians.

If, as a simplification, we assume constant returns to scale in physician practice, we can write

$$AC = c(AQ), \tag{5-4}$$

where:

c = unit cost, and
AQ = aggregate quantity.

Combining equations 5-3 and 5-4, we have

$$NI = [p(AQ) - c(AQ)]/N = (p - c)AQ/N, \tag{5-5}$$

where:

p = the unit price of physician services.

Converting equation 5-5 into rates of change, and subtracting the general rate of inflation π to put the financial rates of growth into "real" terms, we have

$$\dot{NI} - \pi = (\dot{AQ}/N) + [(\dot{p} - \dot{c}) - \pi], \tag{5-6}$$

where a "dot" over a variable indicates the percentage rate of change. Equation 5-6 decomposes the real rate of growth of physician net income into two components, the rate of growth of services provided per physician, $\dot{AQ}/N$, and the real rate of growth of the price/unit cost margin for physician services, $(\dot{p} - c) - \pi$. Equation 5-6 can also be transformed into an aggregate basis (as opposed to a per physician basis) by subtracting the rate of growth in the number of physicians, N, from both sides of the equation:

$$\dot{AI} - \pi = (\dot{AR} - \dot{AQ}) - \pi = \dot{AQ} + [(\dot{p} - c) - \pi], \qquad (5\text{-}7)$$

where

AI = AR - AC = aggregate physician income.

Empirically implementing equations 5-6 and 5-7 requires several steps. Consistent data are available for office-based physicians over the period 1982 to 1988. Net income is measured by equation 5-3. The aggregate receipts of physician offices are estimated by the U.S. Census Bureau's annual Service Annual Survey. Estimates of the mean practice costs of self-employed physicians are published in the American Medical Association's annual Socioeconomic Characteristics of Medical Practice. Aggregate practice costs can be estimated by multiplying this figure by the number of non-federal, office-based, patient-care physicians. Dividing the difference between aggregate receipts and practice costs by the number of (non-federal, office-based) physicians yields the estimate of average physician income.* The compound rate of growth of net income estimated in this way is 7.1 percent per annum between 1982 and 1988. The rate of inflation is measured by the

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*Physician income estimated in this way is reasonable. For example, in 1987 the estimate is $135,302 (for office-based physicians) compared to the AMA SMS estimate of $132,000 (for all physicians, including hospital-based). Not all years are this similar, however.

rate of change in the Consumer Price Index for all urban consumers. The compound rate of growth in the price level between 1982 and 1988 is 3.4 percent per annum, so the real compound rate of growth of physician net income is 3.7 percent.

The quantity of physician services provided by office-based physicians is obtained by deflating pure price changes out of revenue growth. Specifically, aggregate receipts of physician offices from the Service Annual Survey are deflated by the physician services component of the Consumer Price Index and then divided by the number of office-based physicians. The estimated compound rate of growth in services provided per physician from 1982 to 1988 is 1.6 percent per year. The rate of change in the unit price/cost margin is obtained as a residual to satisfy the identity 5-6, since all the other components of the equation are known. The estimated compound rate of change in the real unit profit margin is 2.1 percent per year from 1982 to 1988. Finally, the 2.7 percent annual compound rate of growth of the number of office-based physicians from 1982 to 1988 can be used to convert the per physician numbers to an aggregate basis.

Table 5-1 summarizes the decomposition of the rate of increase in office-based physician income. Aggregate real net income grew at a compound annual rate of 6.4 percent from 1982 to 1988, of which 4.3 percentage points, or two-thirds, can be attributed to growth in quantity of services, and 2.1 percentage points, or one-third, can be attributed to higher profits per service. Thus, both greater provision of services and higher margins per service have contributed significantly to growth in aggregate physician income, but the growth of the quantity of services has played a larger role.

The number of office-based physicians grew at an annual compound rate of 2.7 percent from 1982 to 1988. Hence, on a per physician basis, the growth in net income and services are lower by 2.7 percentage points (the bottom panel of Table 5-1). Per physician real net income grew at an compound annual rate of 3.7 percent from 1982 to 1988, of which 1.6 percentage points, or 42 percent, can be attributed to more services provided per physician, and 2.1 percentage points, or 58 percent, can be attributed to greater profits per

TABLE 5-1

COMPONENTS OF GROWTH IN THE REAL NET INCOME OF OFFICE-BASED PHYSICIANS, AGGREGATE AND PER PHYSICIAN, 1982 - 1988[a]

	Annual Compound Rate of Growth 1982 - 1988	Percentage of Total
I. AGGREGATE[b]		
Physician Real Net Income	6.4%	100%
Aggregate Services	4.3	67
Real Unit Profit Margin	2.1	33
II. PER PHYSICIAN[c]		
Physician Real Net Income	3.7	100
Services Per Physician	1.6	42
Real Unit Profit Margin	2.1	58

[a]Refers only to non-federal, office-based, patient-care physicians.

[b]Based on equation 5 - 7 in the text.

[c]Based on equation 5 - 6 in the text.

Sources:
(1) U.S. Department of Commerce, Bureau of the Census, Current Business Reports: Service Annual Survey, annual.
(2) American Medical Association, Socioeconomic Characteristics of Medical Practice, annual.
(3) American Medical Association, Physician Characteristics and Distribution in the U.S., annual.
(4) U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index, Physician Services Component.

service. Physician income increases in the 1980s cannot solely be attributed to provision of an increased number of services of constant profitability, nor greater profitability of a constant quantity of services per physician. Rather, both more services and higher unit profits have contributed to income growth. In contrast to aggregate income, however, a higher unit profit margin played a larger role in growth of per physician income than increases in services provided.

A second, direct method of evaluating growth in profit per physician service is to compare indexes of physician fees and practice costs. This is done in Table 5-2. The rate of growth in physician fees is measured by annual percentage change in the physician services component of the Consumer Price Index. The rate of growth in practice costs is measured by the overhead and malpractice components of the Medicare Economic Index, HCFA's index of physician practice costs. Unlike the estimate made above, comparing fee and practice cost indexes does not allow for changes in the price/cost margin due to a changing mix of services, but evaluates margin changes for a fixed mix. This is because the CPI index evaluates price changes for a fixed basket of physician services and the MEI cost index evaluates changes in the prices of a fixed bundle of practice inputs.

The average annual percentage changes in the two indexes from fiscal years 1982 through 1989 are roughly equal at about 7 percent. This implies that the price-unit cost margin is also growing by about 7 percent per year.* The average annual percentage growth in the overall CPI from fiscal 1982 through fiscal 1989 was 4.1 percent per year. Thus, the estimated average annual real growth in the unit price/cost margin using this method is about 3 percent per year. This is quite comparable to the 2.1 percent growth estimated above.**

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*The price/unit cost margin is $m = p - c$. If both p and c are growing at rate a (e.g., $a = 1.07$), then m also is growing at rate a: $ap - ac = a(p - c) = am$.

**Note that the 2.1 percent estimated above is a compound rate of growth, while the 3 percent estimated here is a percentage rate of growth. For the same total increase, the compound rate of growth is smaller than the percentage rate of growth.

TABLE 5-2

INCREASES IN INDEXES OF PHYSICIANS' FEES AND PRACTICE COSTS, FISCAL YEARS 1982-89

	ANNUAL PERCENTAGE CHANGES	
Fiscal Year[a]	Physician Services Component of the Consumer Price Index[b]	Overhead and Malpractice Components of the Medicare Economic Index[c]
1982	8.9%	10.2%
1983	7.9	7.4
1984	7.3	4.9
1985	5.5	5.5
1986	7.2	5.9
1987	7.6	7.5
1988	7.4	7.4
1989	6.9	6.4
Average Annual Percentage Change 1982-89	7.3	6.9

[a]Years ending 6/30.

[b]Percentage change from June of one year to June of the next year, e.g., the 1982 value is the percentage change from June 1981 to June 1982.

[c]Without productivity adjustment. Physician work component of the Medicare Economic Index is excluded. Based on the MEI weights, shares of .9 and .1 were used to combine the overhead and malpractice components of the MEI.

Source: U.S. Bureau of Labor Statistics and HCFA, Office of the Actuary.

A possible source of bias in these calculations is the rate of growth in physician prices measured by the physician services component of the Consumer Price Index. The CPI tends to reflect physicians' usual charges for services, but many payors discount these charges in reimbursing physicians. In particular, Medicare froze its physician fees in the middle of our study period, from July 1984 to May 1986. In some cases, physicians "balance bill" for the difference between the third party reimbursement and their usual charge, thus receiving their usual charge as total payment. In other cases, however, physicians are unable to collect their "balance bill" from patients, or they may agree to accept third-party reimbursement as payment in full (e.g., Medicare participating physicians or claims accepted on assignment). Physicians have also been constrained by law from charging Medicare patients as much as they choose. An index of actual prices received, not charges, is the appropriate index to deflate physician receipts in computing quantity growth. If the CPI reflects charges, and the rate of growth of effective fees differs from that of charges, a bias is introduced into the calculations.

It is difficult to evaluate this bias, but some sensitivity analysis can be performed. The AMA's Physician Marketplace Update (Volume 1, Number 4, July 1990) compared the rate of growth between 1987 and 1989 of physicians' unadjusted usual fees and fees adjusted for Medicare discounts. The average annual rate of growth of the adjusted fee was 0.9 percent lower over this period. Therefore, for sensitivity analysis, an assumption that the CPI overstates growth in effective physician fees by 1 percent per year seems reasonable. Under this assumption, the rate of growth of aggregate services rises from 4.3 to 5.3 percent per annum, and the rate of increase in the real unit profit margin falls from 2.1 percent annually to 1.1 percent. Moreover, the annual growth in services per physician rises from 1.6 percent to 2.6 percent. Under this scenario, growth in quantity of services becomes the dominant factor explaining growth both in aggregate net income (accounting for 83 percent of the total, up from 67 percent) and in income per physician (accounting for 70 percent of the total, up from 42 percent). Nevertheless,

the qualitative conclusion that both increases in services provided and in unit profit margins have contributed significantly to income growth is still valid, especially for per physician income.

This conclusion is consistent with other evidence. Studies using Medicare data have shown large increases in volume for many procedures, especially surgery, radiology, and special diagnostic tests (see the summary in Kay, 1990). Moreover, many of the procedures that are most rapidly increasing are among the most profitable relative to physician time and effort (Mitchell et al., 1989). These include cataract operations, coronary artery bypass graft surgery, and upper GI endoscopy. Conversely, cognitive services, such as visits, which are thought to be relatively "underpaid" have not grown as rapidly. In short, the volume of services has increased, and the type of services provided has shifted towards a more profitable mix.

In addition to the limitations of the physician services CPI, another possible source of bias in the above analysis are the assumptions of constant returns to scale and no economies of scope. Physician practice costs of office rent, malpractice insurance, and equipment may be relatively fixed as volume increases. If so, physician profit per service rises as volume increases because fixed costs are spread across more services. Thus, profit per service may have risen faster than the above calculations indicate as the volume of services provided per physician has risen during the 1980s. In addition, physicians may have been able to reduce their unit cost of providing services during the 1980s by jointly providing related services. For example, performing diagnostic tests during office visits may be more economical than providing them at separate times. An economy of joint production is known as an economy of scope. If physicians benefitted from economies of scope as they provided more services in the 1980s, their profits per service may have risen faster than the above calculations indicate. The biases from assuming constant returns to scale and no economies of scope tend to offset inaccuracies resulting from the nature of the physician services CPI. The net bias is unknown.

5.3 Changes in Characteristics of the Physician Population: Age, Sex, FMG Status, and Specialty Mix

Average physician income may be affected by changes in the proportion of physicians with characteristics related to income. For example, holding other characteristics such as specialty constant, female physicians have been found to earn less than male physicians. Thus, a rising proportion of female physicians is expected to lower mean physician income. In this section, we determine if changes in the age, sex, FMG status, specialty mix, and other characteristics of the physician population can explain any of physician income growth over the past decade. We present 5 and 10 year trends using a regression adjustment methodology with the 1978, 1983, and 1988 HCFA Physician Surveys.

Before turning to the trends themselves, Table 5-3 shows changes in characteristics of the physician population sampled by the 1978, 1983, and 1988 HCFA physician surveys. In each year, the tabulations are limited to the 1978 sample population of physicians who are self employed or employed by another physician in groups of less than 10 in 16 specialties. The NORC sampling weights are used to project the actual survey respondents to the sampled population. The surveyed population was considerably younger in 1983 and 1988 than in 1978. The 1988 survey has the highest proportion in the prime earning years of 36 to 55. As expected the number of females in the sample population increased over time, from 3.7 percent in 1978 to 8.7 percent in 1988. The proportion of minorities shows a slight increase from 1983 to 1988. The proportion of foreign medical graduates rises sharply from 1978 to 1983, then falls even more precipitously from 1983 to 1988. The proportion of board certified physicians increases over time, as does the proportion of medical specialists. However, the percentage of general practitioners falls.

Table 5-4 presents changes in physician income from 1978 to 1988 unadjusted and adjusted for physician age, sex, FMG, and specialty mix using the regression methodology explained in Section 3.4.1. Changes for 1978-1983,

TABLE 5-3

CHARACTERISTICS OF THE SELF-EMPLOYED PHYSICIAN POPULATION IN 16 MAJOR SPECIALTIES AND IN GROUPS OF LESS THAN 10, 1978, 1983, AND 1988[a]

	1978	1983	1988
Age			
< 36 years	9.7%	16.8%	14.2%
36-45 years	30.1	32.1	36.1
46-55 years	30.2	25.9	25.2
56-65 years	20.2	17.6	18.3
> 65 years	9.8	7.6	6.2
Sex			
Male	96.3	93.6	91.3
Female	3.7	6.4	8.7
Race			
White	N/A	82.8	81.4
Hispanic	N/A	2.8	3.5
Black	N/A	2.8	3.2
Asian	N/A	11.4	11.7
American Indian	N/A	0.3	0.3
Medical School			
Domestic	83.7	76.8	90.6
Foreign	16.3	23.2	9.4
Board-Certified			
No	39.2	36.0	29.5
Yes	60.8	64.0	70.5
Region			
Northeast	26.9	23.8	24.1
Midwest	22.1	20.6	20.0
South	31.0	33.2	34.4
West	19.9	22.5	21.5
Urban/Rural			
Nonmetropolitan	18.8	19.1	16.0
Metropolitan	81.2	80.9	84.0
Specialty			
GP/FP	23.6	22.4	19.7
Med. Spec.	27.7	29.9	31.4
Surg. Spec.	37.5	35.5	36.0
Other	11.2	12.2	12.9

[a]The sample includes nonfederal patient care physicians, excluding residents, who are self-employed or employed by another physician, in the 16 specialties given in Table 3-1 and in groups with fewer than ten physicians. Results are not generalizable to any other sample. Since values are computed from a sample of physicians, they are subject to sampling error. Based on a frequency distribution using the NORC sampling weights to adjust for nonresponse to the HCFA physician surveys and nonrandomness of the survey samples.

Source: HCFA Physician Practice Cost and Income Surveys, 1978, 1983, and 1988.

TABLE 5-4

CHANGE IN THE AVERAGE NET INCOME OF SELF-EMPLOYED PHYSICIANS[a], UNADJUSTED AND ADJUSTED FOR AGE, SEX, FMG, AND SPECIALTY MIX, 1978-1988

	SELF-EMPLOYED PHYSICIANS[a] IN GROUPS OF LESS THAN 10 IN 16 SPECIALTIES			SELF-EMPLOYED PHYSICIANS[a]
	1978-83	1983-88	1978-88	1983-88
Change in Current Dollars				
Unadjusted	$37,398*	$52,795*	$90,192*	$58,168*
Adjusted	37,744*	50,256*	88,001*	55,163*
Change in 1988 Dollars				
Unadjusted	$4,730	$33,882*	$38,612*	$38,709*
Adjusted	5,242	30,436*	35,678*	35,504*
Percentage Change, 1988 Dollars				
Unadjusted	4.1%	28.3%*	33.6%*	31.4%*
Adjusted	4.6	25.4*	31.0*	28.8*
Average Annual Compound Rate of Growth, 1988 Dollars				
Unadjusted	0.81%	4.99%*	2.90%*	5.47%*
Adjusted	0.89	4.52*	2.70*	5.07*

[a]Also includes physicians who are employed by another physician. Excludes employees of hospitals, HMOs, or clinics.

*Statistically significantly different from zero to the 5 percent level, two tailed test.

Note: The adjusted changes hold constant 5 age categories and 16 specialties (the first three columns) or 18 specialties (the final column). Five racial categories are also held constant in the final column.

Source: HCFA Physician Practice Cost and Income Surveys, 1978, 1983, 1988.

1983-1988, and 1978-1988 are given for the 1978 HCFA survey physician sample (physicians who are self-employed or employed by another physician in groups of less than 10 in 16 specialties); a set of changes for 1983 to 1988 was also computed that includes all group sizes and specialties.

Adjusting for age, sex, FMG, and specialty mix has only a small effect on the estimated growth in physician net income. For example, the 10 year average annual compound rate of growth is reduced only from 2.90 percent to 2.70 percent by this adjustment. The 5 year rate of growth (larger sample) is lowered only from 5.47 percent to 5.07 percent. Hence, only about 7 percent [(5.47-5.07)/5.47 or (2.9-2.7)/2.9] of the 5 and 10 year growth in physician income can be attributed to the changing age/sex/FMG/specialty mix of physicians.

Holding constant these four characteristics slightly reduces income growth over the 5 and 10 years prior to 1988. However, it <u>increases</u> measured income growth from 1978 to 1983 (although the 1978 to 1983 change in income is not statistically significant). The higher 1978 to 1983 adjusted growth rate is particularly related to the growing proportion of female physicians over that period.

Table 5-5 shows the effect of holding various characteristics constant on measured growth in mean physician real net income. The change in income is measured by the average annual compound rate of growth and the characteristics are held constant in a stepwise, or incremental, fashion. Holding only sex constant raises income growth because female physicians earn less and are a growing proportion of the physician population. When age is also held constant, growth is lowered nearly to the unadjusted rate. Adding FMG status lowers income growth since the proportion of the lower-earning FMGs was higher in 1988 than in 1983 or 1978 (see Table 5-3). Controlling for four major specialty groups--general/family practice, medical specialties, surgical specialties, and other specialties--has little incremental effect on measured income growth. The effect of holding constant 16 or 18 detailed specialties is somewhat larger, indicating that most of the effect of physician

TABLE 5-5

AVERAGE ANNUAL COMPOUND RATE OF GROWTH IN THE MEAN REAL NET INCOME OF SELF-EMPLOYED PHYSICIANS[a], HOLDING VARIOUS CHARACTERISTICS CONSTANT, 1978-1988

Characteristics Held Constant:	1978-88[b]	1983-88
Unadjusted	2.90%	5.47%
Sex	3.03	5.57
Sex, Age	2.92	5.42
Sex, Age, Race	--	5.45
Sex, Age, Race, FMG	2.84	5.29
Sex, Age, Race, FMG, Major Specialty[c]	2.83	5.25
Sex, Age, Race, FMG, Detailed Specialty[d]	2.70	5.07
Sex, Age, Race, FMG, Detailed Specialty, Board-Cert., Groupsize, Metro./Nonmetro., Region	2.60	5.02

[a]Also includes physicians who are employed by another physician. Excludes employees of hospitals, HMOs, or clinics.

[b]Physicians in groups of less than 10 in 16 specialties. Race is never held constant in this column.

[c]Major specialties are GP/FP, medical specialties, surgical specialties, and other specialties.

[d]Detailed specialties are 16 specialties (Table 3-1) for 1978-88 and 18 specialties for 1983-88.

Note: All growth rates are statistically significant greater than zero at the 5 percent level.

Source: HCFA Physician Practice Cost and Income Surveys, 1978, 1983, 1988.

specialization on income is occurring within the major specialty groupings. Controlling for board-certification, groupsize, and urban-rural and regional location in addition to the other characteristics slightly lowers income growth.

Even with all these characteristics held constant, measured income growth is reduced by only 10 percent [(2.9-2.6)/2.9] from 1978 to 1988, or by 8 percent [(5.47-5.02)/5.47] from 1983 to 1988. We conclude that changes in demographic, specialty, practice, and locational characteristics of physicians account for only a small portion of their income gains over the 5 and 10 year periods studied. These factors explain 10 percent or less of income growth.

Table 5-6 presents unadjusted and adjusted income trends by physician subgroups defined by demographic, specialty, practice, and geographic characteristics. The average annual compound rates of growth are adjusted for age, sex, FMG status, and major specialty (GP/FP, medical specialties, surgical specialties, and other specialties). Detailed specialty is not held constant because of the small sample sizes for some of the characteristics/years.

The unadjusted rates of income growth by subgroup are consistent with the changes in income presented in Section 4.2. Adjusting for age/sex/FMG/specialty mix generally slightly lowers the rate of income growth, as it does for the full sample. However, there are exceptions. Income growth among physicians under age 46 is raised by the adjustment. This may be largely due to the rapidly increasing proportion of female physicians in these age groups. The income growth of "other" specialties (e.g., psychiatrists, anesthesiologists) is also raised by the adjustment. Again, this could be the result of a higher proportion of female doctors in these specialties over time.

5.4 More Comprehensive Insurance Coverage for Physicians' Services

More comprehensive insurance coverage has long been pointed to as one of the prime factors driving up health care expenditures (e.g., Feldstein, 1981). Greater insurance coverage has effects on both patients and providers

TABLE 5-6

AVERAGE ANNUAL COMPOUND RATE OF GROWTH IN THE MEAN REAL NET INCOME OF SELF-EMPLOYED PHYSICIANS[a], BY SUBGROUP, UNADJUSTED AND ADJUSTED FOR AGE, SEX, FMG STATUS, AND MAJOR SPECIALTY, 1978-1988

Physician Subgroup	1978-88[b]	1983-88
Sex		
Male		
Unadjusted	3.01%	5.66%
Adjusted	2.84	5.21
Female		
Unadjusted	4.53	4.27
Adjusted	4.01	3.59
AGE		
< 36 years		
Unadjusted	2.92	4.58
Adjusted	3.18	4.97
36-45 years		
Unadjusted	2.79	5.98
Adjusted	3.22	6.21
46-55 years		
Unadjusted	2.58	5.31
Adjusted	2.43	4.86
56-65 years		
Unadjusted	2.54	4.38
Adjusted	2.25	3.45
> 65 years		
Unadjusted	3.75	3.99*
Adjusted	3.50	3.07*
Specialty		
General/Family Practice		
Unadjusted	0.89	2.62
Adjusted	0.69*	2.07
Medical Specialties		
Unadjusted	2.17	5.29
Adjusted	2.10	4.60
Surgical Specialties		
Unadusted	3.78	6.57
Adjusted	3.80	6.35
Other Specialty		
Unadjusted	3.57	4.87
Adjusted	3.61	4.98

TABLE 5-6 (continued)

AVERAGE ANNUAL COMPOUND RATE OF GROWTH IN THE MEAN REAL NET INCOME OF SELF-EMPLOYED PHYSICIANS[a], BY SUBGROUP, UNADJUSTED AND ADJUSTED FOR AGE, SEX, FMG STATUS, AND MAJOR SPECIALTY, 1978-1988

Physician Subgroup	1978-88[b]	1983-88
Location		
Nonmetropolitan		
Unadjusted	2.14	4.40
Adjusted	1.85	3.76
Metropolitan		
Unadjusted	3.01	5.58
Adjusted	3.01	5.33
GROUPSIZE		
Solo		
Unadjusted	2.68	5.01
Adjusted	2.51	4.81
2-4 Physicians		
Unadjusted	2.93	6.24
Adjusted	3.12	5.71
5-9 Physicians		
Unadjusted	2.11	5.03
Adjusted	2.57	4.98
10+ Physicians		
Unadjusted	N/A	4.62
Adjusted	N/A	5.03
REGION		
Northeast		
Unadjusted	4.35	7.04
Adjusted	4.15	6.82
Midwest		
Unadjusted	2.51	4.15
Adjusted	2.36	3.61
South		
Unadjusted	2.19	5.32
Adjusted	2.10	4.80
West		
Unadjusted	2.82	5.42
Adjusted	3.04	5.39

[a]Also includes physicians employed by another physician.

[b]Physicians in groups of less than 10 in 16 specialties.

*Not statistically significant at the 5 percent level.

Note: Five age categories and four specialty groups (i.e., general/family practice, medical specialties, surgical specialties, other specialties) are held constant.

Source: HCFA Physician Practice Costs and Income Surveys, 1978, 1983, 1988.

of physician care. It lowers the price of physician services to patients at the time of consumption, thereby increasing their demand for care.* Fee-for-service reimbursement also shifts up the demand curve facing physicians, allowing them to raise their price and quantity (Sloan, 1982). Increasingly comprehensive insurance coverage over time tends to raise expenditures on physician services and physicians' incomes.

Good time series data on the extent of insurance coverage for physician services is difficult to find. In part this is because insurance policies differ in complex ways, such as deductibles, coinsurance rates, and benefit limits and exclusions. We use an indirect measure of the extent of insurance coverage, the proportion of expenditures for physician services paid out-of-pocket. These data are estimated annually by the Office of the Actuary in the Health Care Financing Administration.

Out-of-pocket expenditures do not perfectly measure the extent of insurance coverage. An example shows why. Suppose that insurance coverage (e.g., deductibles and coinsurance rates) is constant, but that morbidity rises in the population (e.g., an influenza epidemic). Then more people will seek the care of a physician and exceed their deductible for physician services. Out-of-pocket expenditures as a proportion of total expenditures will fall, even though the extent of insurance coverage is constant. In spite of some ambiguity, out-of-pocket expenditures should be a good proxy for the extent of insurance coverage.

Table 5-7 shows trends in out-of-pocket as a proportion of total spending for physician services. The out-of-pocket proportion has been falling for a long time, from 63 percent in 1960 to 43 percent in 1970 and 33 percent in 1975, for example. The trend towards greater insurance coverage has continued in the 1980s, when the out-of-pocket proportion fell from 27 percent in 1980 to 19 percent in 1988.

The experience of the giant Medicare program, which paid for 24 percent of all physician services in 1988 (Office of the Actuary, HCFA), verifies the trend towards more comprehensive insurance coverage in the 1980s. Medicare

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*Demand for physician services is relatively inelastic--an elasticity of about .1 or .2--so that large changes in price are necessary to affect demand substantially. See, e.g., Manning et al., 1987.

TABLE 5-7

OUT-OF-POCKET PAYMENTS AS A PROPORTION OF TOTAL EXPENDITURES ON PHYSICIAN SERVICES, SELECTED YEARS

Year	Proportion Out-of-Pocket
1960	62.7%
1970	42.8
1975	32.8
1978	30.1
1979	28.3
1980	26.9
1981	26.3
1982	25.1
1983	24.0
1984	23.3
1985	21.8
1986	19.9
1987	19.2
1988	18.9

Source: Office of the Actuary, Health Care Financing Administration.

beneficiaries are subject to three types of out-of-pocket expenses for physician services: deductibles, copayments, and balance billing by physicians. The annual Medicare Part B deductible remained at $75 from 1982 through the end of the decade. (It is scheduled to rise to $100 in 1991.) Over this time (1982-89), the price level, measured by the Consumer Price Index, rose by 29 percent, eroding the real value of the deductible by this amount. The 20 percent Part B copayment was not changed, but many beneficiaries purchase supplemental Medigap policies that pay Medicare coinsurance (and the deductible and balance bill, in some cases). Other beneficiaries' out-of-pocket costs are covered by Medicaid. Finally, a higher percentage of Medicare claims are being accepted on assignment, which eliminates "excess charges" to beneficiaries. Part B assignment rates have increased from 50 percent of claims in 1980 to 78 percent in 1988 (Kay, 1990).

More comprehensive insurance coverage, then, appears to be a long-term, fundamental force driving up expenditures on physician services, and tending to augment physicians' incomes. Also, specialties whose services are covered more completely by insurance have experienced the most rapid income growth. Surgery is well-insured and surgeons' incomes have grown most rapidly. Conversely, the services of general/family practitioners and pediatricians are less well-insured and their incomes have lagged.

It is more difficult to associate the out-of-pocket proportion with some of the short-term changes in physician income. According to our analysis, real physician income was stagnant, on average, between 1978 and 1983, then grew rapidly from 1983 to 1988. Yet the decline in the proportion of expenditures paid out-of-pocket has been fairly uniform over this period. It appears necessary to combine the slower rate of growth in the physician supply in the 1980s (see Section 5.1) with the steady increase in demand due to expanding insurance coverage to explain this pattern.

5.5 Outpatient Shift and Technology Diffusion

Our examination of physician income trends in Chapter 4 showed that real physician income was relatively flat from 1982 to 1985, and only began growing

rapidly after 1985 (this assertion is based on the annual AMA data). Although the coincidence is not exact, the timing of physician income increases suggests a connection with the massive shift from inpatient to outpatient services that has occurred in the 1980s. Length of stay in short-term hospitals has been secularly declining and inpatient admissions peaked in 1981 (American Hospital Association, Hospital Statistics, Table 1), but the implementation of Medicare's Prospective Payment System beginning in 1983 greatly stimulated the shift to the outpatient setting. With PPS implementation hospitals (and physicians) had an incentive to shift care out of inpatient wards so that it would be reimbursed separately from the DRG payment. Through utilization review and prospective reimbursement for inpatient services, private third-party insurers have also encouraged the substitution of outpatient for inpatient care. The result was an explosion in outpatient surgery and diagnostic testing in hospital outpatient departments, freestanding surgery and imaging centers, independent laboratories, and physician offices. For example, the number of outpatient visits to hospitals grew only 4 percent from 1978 to 1983, then rose by 23 percent from 1983 to 1988 (AHA, Hospital Statistics, Table 1). The lag from PPS implementation until physicians' incomes began rising may have been caused by the time necessary to build the infrastructure for outpatient care--hospital outpatient departments, ambulatory surgery centers, independent imaging centers and laboratories, downsizing diagnostic and laboratory equipment for physicians' offices, etc.

Physicians' increased outpatient earnings have more than offset their reduced inpatient revenues. They now earn an entrepreneurial return on the capital (equipment and building space) and labor (aides) necessary for procedures and tests that formerly went to hospitals. The HCFA Physician Surveys show the increasing employment of ancillary personnel by physicians in their practices. After growing a statistically insignificant 5 percent between 1978 and 1983, the number of nonphysician aides per self-employed physician increased by a statistically significant 16 percent from 1983 to

1988, from 2.71 to 3.13 aides per physician.* Bureau of Labor Statistics and American Medical Association data indicate that the hours of nonsupervisory workers in physicians' offices per patient care physician hour has increased 9 percent from 1982 to 1986 (Pope, 1989). Nonphysician aides--e.g., technicians, nurses, and midwives--generate revenues for physicians by providing services or performing diagnostic tests.

In the ambulatory setting, physicians often bill for the technical components of tests, not just the interpretation. Radiologists have considerably expanded their earnings by participating in freestanding imaging centers with CT-scan and MRI capability. Outpatient lithotripsy and endoscopy by urologists to extract urinary stones has increased rapidly. Internists and cardiologists perform cardiography and stress tests in their offices. Orthopedic surgeons do many more outpatient arthoscopies. Outpatient endoscopic examinations performed by internists, general surgeons, and other specialties have boomed. Fetal ultrasound testing by obstetricians has diffused rapidly in the 1980s. Changes in payment methods and improved technology have encouraged physicians to perform more in-office laboratory testing (Eisenberg et al., 1987). Lens extractions by ophthmalogists have experienced one of the most remarkable inpatient to outpatient shifts in the 1980s, moving from more than 90 percent in an inpatient setting at the beginning of the decade to almost exclusively an outpatient setting by the end.

Surgeons have especially benefitted from the outpatient shift. Surgical operations in short-term hospitals increased only 15 percent from 1980 to 1988 (American Hospital Association, Hospital Statistics, Table 2B, annual), but the growth in freestanding surgical centers and operations has been phenomenal in the 1980s. According to SMG, a Chicago market research group, in 1983 there were only 239 freestanding facilities performing 377,266 operations. By 1988, there were 964 facilities performing 1,702,397 operations, almost a

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*For physicians who are self-employed or employed by another physician in groups of less than 10 in 16 specialties.

five-fold increase in five years. SMG expects that by 1990, 2.8 million procedures will be performed in freestanding surgical centers (Rosenbach, et al., 1989). Little data are available on surgical operations in physicians' offices, but SMG projects that the number of these procedures will grow from 842,000 in 1988 to 1.25 million in 1990, a 48 percent growth in just two years. For the most part, increased outpatient surgery seems to have added to, rather than substituted for, inpatient surgery.

Lower cost and convenience for patients has probably been a major reason that the volume of many procedures and tests have skyrocketed in the outpatient setting. Without a hospital admission, patients can avoid expensive inpatient deductibles and copayments. Their time costs are also lower because of the convenience of ambulatory surgical centers and doctors' offices; recovery times for outpatient procedures are also often lower. Outpatient procedures are often less invasive, painful, and risky than inpatient procedures. For example, outpatient procedures may require local rather than general anesthesia. Another important factor in increased outpatient volumes may be the much less stringent utilization review afforded to outpatient activity than to inpatient admissions.

Technological advances and diffusion have enabled the growth of many of these outpatient procedures and tests, and also contributed to increases in inpatient physician earnings. Some important technologies that have become widespread during the 1980s are flexible scopes for endoscopies, the extracapsular technique for cataract surgery, MRI, CT-scan, lithotripsy, ultrasound, and percutaneous transluminal coronary angioplasty. Many of these technologies have diffused rapidly in both hospital and freestanding settings in the 1980s (see Cromwell and Pope, 1988 for diffusion among hospitals). Older procedures/technologies such as joint replacements and open heart surgery (e.g., CABG) have also been refined and are performed on a wider set of patients (e.g., older ones) than previously because of improved outcomes. The rate of CABGs per capita rose 58 percent from 1982 to 1987 for ages 45-64 and 168 percent for ages 65 and over (Boutwell, et al., 1989). As a result,

the net incomes of cardiovascular/thoracic surgeons have soared (see Chapter 4). Cesarean section rates have been growing steadily for many years, and have continued to increase in the 1980s (Rosenbach et al., 1989). The secular movement from vaginal deliveries to the more profitable surgical deliveries may be one factor behind the financial gains of obstetricians/gynecologists in the 1980s. Rising numbers of arthroscopies, hip replacements, and fracture repairs are presumably a driving force behind the very rapid income gains of orthopedic surgeons noted in Chapter 4.

5.6 Summary and Conclusions

Several long-term trends have tended to increase demand for physician services:

- Population growth. The United States population grew by 8 percent between 1980 and 1988.
- The aging of the population. The median age in the United States rose from 30.0 years in 1980 to 32.1 years in 1987 (Statistical Abstract of the United States).
- More comprehensive insurance coverage. Out of pocket spending as a proportion of total spending for physician services fell from 26.9 percent in 1980 to 18.9 percent in 1988.
- Technological advances that have expanded the range and complexity of services that physicians offer.

These secular trends have intersected with several shorter-run changes that help to explain rapid physician income growth in the 1980s. Although the number of physicians and the physician to population ratio continue to increase rapidly, the rate of increase in the physician supply has slowed. The average annual compound rate of growth in the patient care physician to population ratio fell from 3.2 percent from 1978 to 1983 to 2.4 percent from 1983 to 1988, a decrease of one-quarter. Changes in the age/sex/FMG specialty mix of physicians also explain some of physician income growth over the last 5 to 10 years, albeit only 10 percent or less of the total increase.

The shift away from the inpatient setting appears to have benefitted physicians. They now earn an entrepreneurial return on capital (equipment, building space) and labor (aides) formerly appropriated by hospitals. The lower cost of ambulatory care, both financially and in terms of convenience, apparently has greatly stimulated utilization. The development, diffusion, and perfection of surgical and diagnostic techniques, both in the inpatient and ambulatory settings, has substantially augmented physicians' earnings.

Physicians' incomes have not risen because of a larger number of patient contacts. Rather, physicians are providing more services per visit (Pope, 1989; Schwartz and Mendelson, 1990). Both increases in the quantity of services provided per physician and increases in the profit (price-cost margin) per service have contributed significantly to physicians' income gains from 1982 to 1988. Profitability per service seems to have grown both because physicians have raised prices more than their costs have increased and because physicians are providing a more profitable mix of services. Many of the services whose utilization has grown most rapidly are profitable surgeries and diagnostic tests.

REFERENCES

American Medical Association, Physician Characteristics and Distribution in the U.S., 1983 and 1987 editions.

American Medical Association, Physician Distribution and Medical Licensure in the U.S., 1978.

American Medial Association, Profile of Medical Practice, 1980.

American Medical Association, Socioeconomic Characteristics of Medical Practice, 1989 edition.

Auster, R.D. and R.L. Oaxaca, "Identification of Supplier Induced Demand in the Health Care Sector," The Journal of Human Resources, 16(3):327-342, 1981.

Boutwell, R.C., et al., Trends in Inpatient Use By The Elderly and Other Adults For Selected Procedures: 1982-1987, Final Report, HCFA Cooperative Agreement No. 17-C-98999/1, November 1989.

Burstein, P.L. and J. Cromwell, "Relative Incomes and Rates of Return for U.S. Physicians," Journal of Health Economics, 4:1, 1985.

Cromwell, J. and J.B. Mitchell, "Competitive Effects on Psychiatrists' Workloads, Work Efforts, Fees, and Incomes, NIMH Contract No. 278-84-0012(DB), February 1986a.

Cromwell, J. and G. Pope, The Impact of Medicare's Prospective Payment System on Hospital Technology and Service Diffusion, Draft Final Report HCFA Contract No. 500-85-0015, December 6, 1988.

Cromwell, J. and J.B. Mitchell, "Physician-Induced Demand for Surgery," Journal of Health Economics, 5(1986b):293-313.

Dresch, S.P., "Marginal Wage Rates, Hours of Work, and Returns to Physician Training and Specialization," Health Care Financing Conference Proceedings, pp. 165-200, August 1981.

Eisenberg, J.M., et al., "How Will Changes in Physician Payment by Medicare Influence Laboratory Testing," The Journal of the American Medical Association, 258(6):803-808, August 14, 1987.

Fein, R. and G.I. Weber, Financing Medical Education: An Analysis of Alternative Policies and Mechanisms. New York: Carnegie Commission on Higher Education; Commonwealth Fund (McGraw-Hill), 1971.

Feldstein, M., Hospital Costs and Health Insurance, Harvard University Press, 1981.

Friedman, M. and S. Kuznetz, Income from Independent Professional Practice, New York:NBER, 1945.

Gonzalez, Martin L., "Trends, Variations, and Distribution of Physician Earnings, 1977-1987," Socioeconomic Characteristics of Medical Practice, American Medical Association, 1988.

Headen, A.E., "Wage Returns to Ownership, and Fee Responses to Physician Supply," Review of Economics and Statistics, pp. 30-37, 1990.

Kay, T.L., "Volume and Intensity of Medicare Physicians' Services: An Overview," Health Care Financing Review, 11(4):133-146, Summer 1990.

REFERENCES (continued)

Kehrer, Barbara H., "Factors Affecting the Incomes of Men and Women Physicians: An Exploratory Analysis," Journal of Human Resources, 11:4, Fall 1976.

Kletke, Phillip R., William D. Marder and Anne B. Silberger, The Demographics of Physician Supply: Trends and Projections, American Medical Association Center for Health Policy Research, 1987.

Kessel, R., "Price Discrimination in Medicine," Journal of Law and Economics, pp. 20-53, October 1958.

Langenbrunner, J.C., D. Williams, and S. Terrell, "Physician Incomes and Work Patterns Across Specialties: 1975 and 1983-84," Health Care Financing Review, 10:2, 1988.

Langwell, K.M., "Differences by Sex in Economic Returns Associated with Physician Specialization," The Journal of Health Politics, Policy, and Law, 6(4):752-761, Winter 1982b.

Langwell, K.M., "Factors Affecting the Incomes of Men and Women Physicians: Further Explorations," The Journal of Human Resources, 17(2):262-275, 1982a.

Leffler, K.B., "Physician Licensure: Competition and Monopoly in American Medicine," Journal of Law and Economics, pp. 165-186, Spring 1978.

Lindsay, C.M., "Real Returns to Medical Education," The Journal of human Resources, 13(3):331-347, Summer 1973.

Manning, W.G., et al., "Health Insurance and the Demand for Medical Care: Evidence from a Randomized Experiment," American Economic Review, 77(3):251-277, June 1987.

McGuire, T., "TI/PID Model with Fee Setting and Multiple Payers: Income and Substitution Effects" unpublished working paper, Boston University, April 1990.

Mennemeyer, S.T., "Really Great Returns to Medical Education?," The Journal of Human Resources, 13(1):75-90, 1978.

Mitchell, Janet B., Practice Patterns and Earnings of Women Physicians, Discussion Paper, Health Care Financing Administration, Grant Number 18-P-97723/1-01, June 30, 1982.

Mitchell, Janet B., "Why Do Women Physicians Work Fewer Hours Than Men Physicians?" Inquiry, Vol. 21, pp. 361-368, Winter 1984.

Mitchell, J.B., G. Wedig, and J. Cromwell, "The Medicare Physician Fee Freeze," Health Affairs, 8(1):21-33, Spring 1989.

Noether, M., "The Growing Supply of Physicians: Has the Market Become More Competitive?," Journal of Labor Economics, 4:4, 1986.

Ohsfeldt, R.L. and S.D. Culler, "Differences in Income Between Male and Female Physicians," The Journal of Health Economics, 5(4):293-375, December 1986.

Pauly, M., Doctors and Their Workshops, Chicago: University of Chicago Press, 1980.

Pope, G.C., "Physician Inputs, Outputs, and Productivity, 1976-1986," Inquiry, 27(2):151-160, Summer 1990.

REFERENCES (continued)

Rice, T. and N. McCall, "Changes in Medicare Reimbursement Rates in Colorado: Impact on Physicians' Economic Behavior," Health Care Financing Review, 3(4):67-85, June 1982.

Rosenbach, M., et al., Study of Nurse Anesthesia Needs, Final Report, Division of Nursing, Contract No. 240-89-0008, October 1989.

Rossiter, L.F. and G.R. Wilensky, "Identification of Physician-Induced Demand," The Journal of Human Resources, 19(2):231-244, 1984.

Schwartz, W.B. and D.N. Mendelson, "No Evidence of an Emerging Physician Surplus," The Journal of the American Medical Association, 263(4):557-560, January 26, 1990.

Sloan, F.A., "Effects of Health Insurance on Physicians' Fees," The Journal of Human Resources, 17(4):533-557, 1982.

Sloan, F.A., "Lifetime Earnings and Physicians' Choice of Specialty," Industrial and Labor Relations Review, 24(1):47-56, October 1970.

Sprachman, S., et al., Physicians' Practice Costs and Income Survey User's Guide and Codebook, HCFA Contract No. 500-83-0025, December 1985.

U.S. Congressional Budget Office, "Volume Responses to Exogenous Changes in Medicare's Payment Policies," Technical Memorandum, August 1989.

U.S. Department of Commerce, Statistical Abstract of the United States, 1989, 109th Edition, 1989.

U.S. Department of Health, Education, and Welfare, The Target Income Hypothesis and Related Issues in Health Manpower Policy, January 1980.

Willke, R.J. and P.S. Cotter, "Young Physicians and Changes in Medical Practice Characteristics Between 1975 and 1987," Inquiry, 26:1, 1989.

Wilson, R.A., "Returns to Entering the Medical Profession in the U.K.," Journal of Health Economics, 6:4, 1987.

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